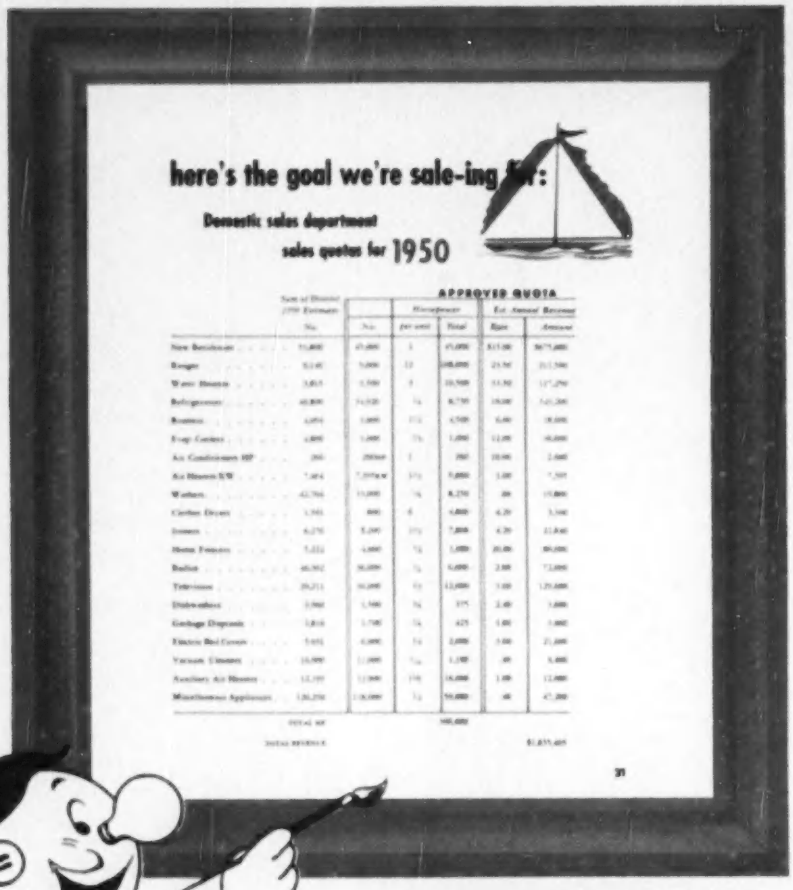
ELECTRICAL WEST

May 1950
25 Cents

What People Think About Socialism, Page 55
Appliances, Page 85

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.



pretty picture!

More than likely, this illustration won't win any salon prizes, or be shown in any museums. From an artistic point of view, it isn't so much.

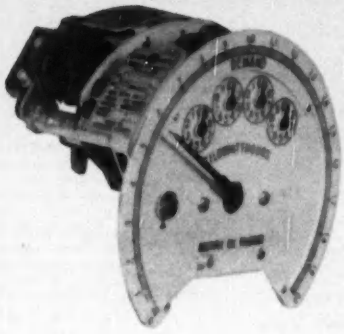
A jury of electrical appliance dealers would say it's a mighty pretty picture, though! We're painting it in sales.

This page from the Edison Company's Business Development Program for 1950 lists some pretty sizeable quotas—9000 electric ranges, 3500 electric water heaters and 34,920 electric refrigerators, to mention just a few.

These are the sales Edison is going after this year, with hard-hitting promotions. And if you're an appliance dealer, you ought to follow every move—because *every sale will be rung up in a dealer cash register!*

SOUTHERN CALIFORNIA EDISON COMPANY

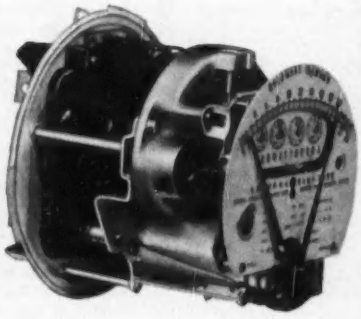
FOR MEASUREMENT OF *Small Demands*



TYPE M-30—DEMAND REGISTER

- M-30 *mechanical-type register* (for mounting on a watthour meter)—measures kilowatt demand.
- Demand register can be substituted for conventional register on many types of watthour meters and totalizing relays
- Positive reset
- Simple adjustments
- Minimum number of parts
- Moderate price, low installation cost.

Ask for publication GEC-413.



TYPE IHM—WATTHOUR DEMAND METER

- IHM *thermal-type meter* does the work of two meters—measures both kilowatt-hours and kilowatt demand
- "Direct-heat" principle produces high torque, permits large, sturdy parts
- Sustained accuracy at high and low loads
- No overshoot on transient loads
- Short testing time
- Low installation cost.

Ask for publication GEC-408.

General Electric's complete metering service can help you in two ways—by providing everything you need in metering service; by helping you apply it for proper results. Get in touch with your G-E representative for product and application assistance —now. Apparatus Department, General Electric Company, Schenectady 5, New York.

GENERAL ELECTRIC

608-47

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

MAY 1950

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright, Sixty-second year of publication

ELECTRICAL WEST

James H. McGraw (1860-1948), Founder
Curtis W. McGraw, Chairman of the Board — George C. Tenney, President and Editor
W. A. Orr, Associate Editor — Walter C. Hasloo, Engineering Editor
Peggy Boyer, Assistant Editor — R. A. Balsari, Publishing Counselor
John W. Otterson, Manager — John Coutts, Typography

Convention-In-Print

Theme for this year's "Convention-In-Print" will be "Frontiers for 1950." Electrical West's June special issue each year gives all readers of the West the benefit of a figurative convention since there is no coast-wise industry convention.

A leader in each branch of the industry has been selected who will tie in the theme with his particular branch of the industry. Those in management, public relations, advertising, sales and engineering will "speak" for the utilities. A leader in each other branch of the industry will discuss a timely topic or the problems of his particular group.

The industry has many frontiers ahead. This year we are particularly fortunate in having on our "program" some unusually outstanding men from the electrical industry as speakers.

Presidents of the three industry associations of the West will present their annual message in print: H. N. Walters for the Northwest Electric Light and Power Assn.; I. W. Borda for the Pacific Coast Electrical Assn. and W. D. Johnston for the Rocky Mountain Electrical League.

In addition there will be reports of several important electrical industry meetings held during May.

And rounding out an important big issue will be the regular Electrical West features—sales and contractor's news letters: new products: news of the industry.

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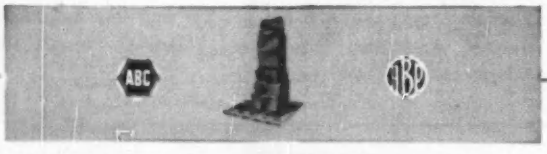
Cover: Los Angeles Department of Water & Power window display, showing contrast between old-fashioned and adequate wiring.

ADVERTISING REPRESENTATIVES

Chicago (11) ..... Philip S. Griffin, 520 N. Michigan Ave.
Cleveland (15) ..... Frank J. Seiler, 1510 Hanna Bldg.
Los Angeles (17) ..... W. D. Lanier, 1111 Wilshire Blvd., MA. 6-4323
New York (19) ..... John P. Eichorn, 330 W. 42nd St.
San Francisco (4) ..... Tom Carmody, 68 Post St., DO. 2-4600



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VOL. 104 NO. 5

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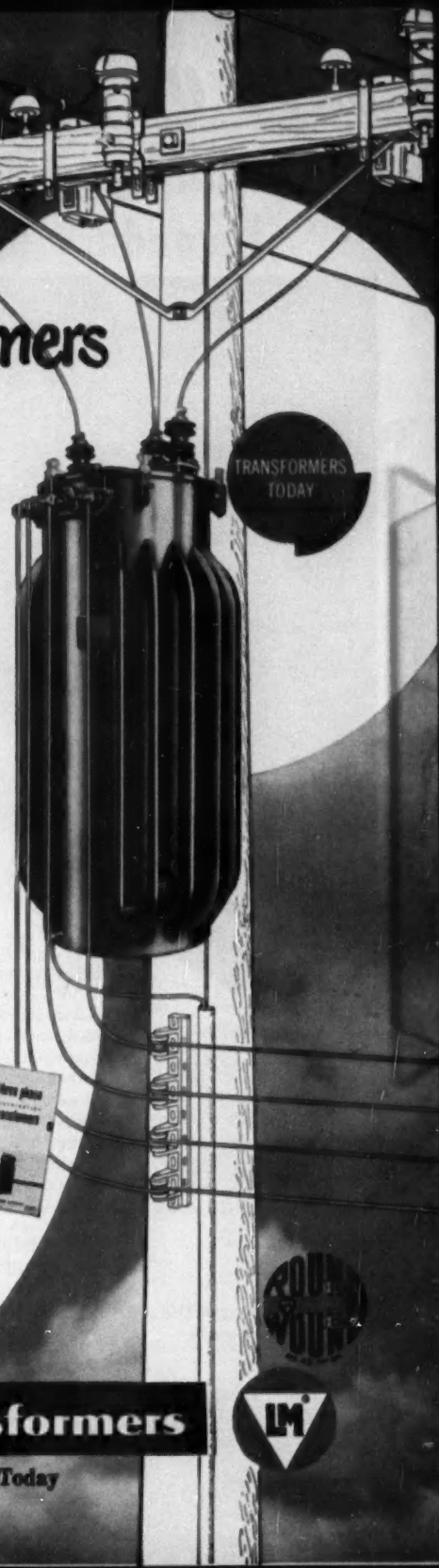
YOU MAKE THESE 3 SAVINGS WITH L-M 3-phase Transformers



1. INSTALLATION:

It's simpler to hang and wire one 3-phase transformer than a bank of three single-phase units—and it's safer, too!

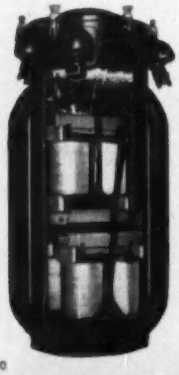
2. POLE SPACE:

L-M sizes through 112½ kva can be bolted directly to the pole. You eliminate additional cross arms and get greatly improved appearance.

3. OPERATING COST:

The impedances of all three units in a 3-phase transformer are identical. This eliminates the circulating currents and losses in operation which may occur in banks of three single phase units.

Perhaps you, like many others, would like more information on the relative advantages of 3-phase transformers and single-phase banks. If you care to drop your problem in our lap, we'll be glad to work with you. Ask the L-M Field Engineer, or write Transformer Division, Line Material Co., Zanesville, Ohio (A McGraw Electric Company division).



Ratings from 9 to 150 kva have famous L-M "Round-Wound" construction with its many advantages. Ratings from 225 to 500 kva have *round* coils on a three-legged stacked core; these offer many advantages not inherent in square-coil construction. For data and dimensions write for Bulletin DT5.

Three core-coil units mounted in one rigid frame, for best cooling and maximum accessibility. Any one of the three units may easily be removed and replaced if necessary.

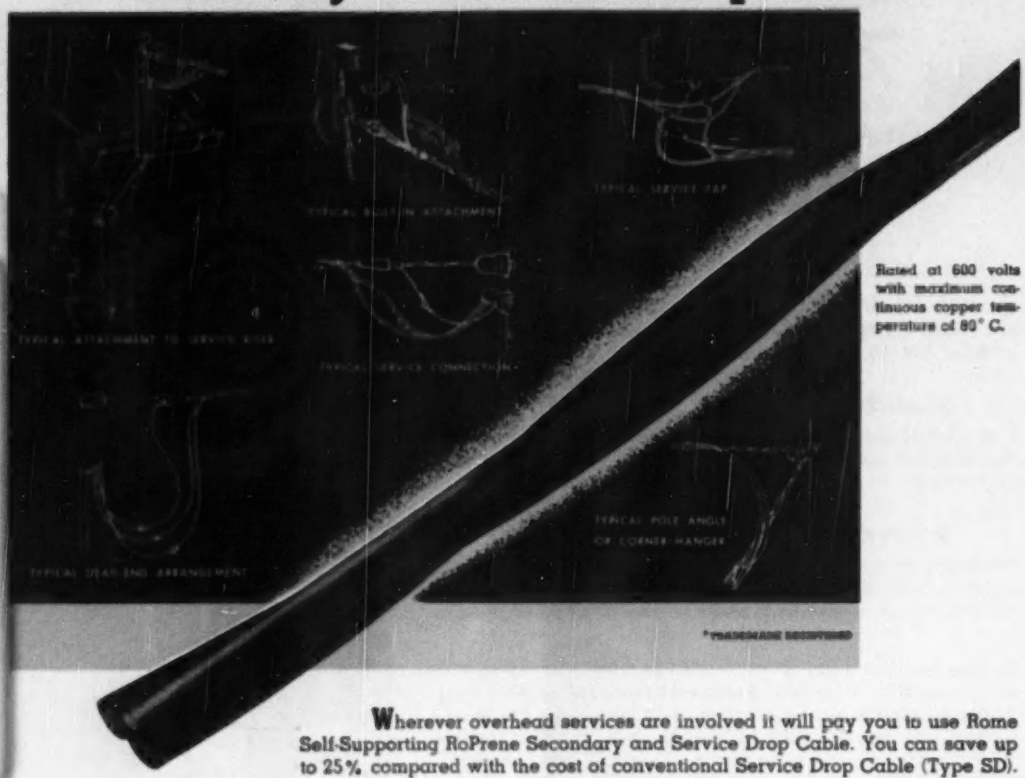
7890

LINE MATERIAL ... Transformers

Complete Coordinated Equipment for Distribution Today

SAVE UP TO 25%...

with Rome Self-Supporting RoPrene Secondary and Service Drop Cable



Rated at 600 volts with maximum continuous copper temperature of 80° C.

Wherever overhead services are involved it will pay you to use Rome Self-Supporting RoPrene Secondary and Service Drop Cable. You can save up to 25% compared with the cost of conventional Service Drop Cable (Type SD). Construction is better and it lasts longer. There are no coverings to rot and festoon. It has remarkable weather resistance. It possesses excellent physical and electrical characteristics.

Installation and maintenance costs are also less than the cost of open weatherproof wire. Less labor and cheaper hardware can be used. When used as secondaries, Rome Self-Supporting RoPrene Cable is more compact, eliminates unsightly multiple wire construction, jointly occupied poles and long spans. On larger sizes, there is also a substantial saving in copper losses due to the lower reactance of a self-supporting cable compared with open wires.

NEW DATA AVAILABLE!—BULLETIN RS-4, just published contains specification and test details, as well as sag and tension data on Rome Self-Supporting RoPrene Cable. It's yours for the asking. Sign and mail the coupon below or write.

IT COSTS LESS TO BUY THE BEST...BUY ROME CABLE

ROME CABLE CORPORATION, Dept. EW-5 Rome, N. Y.
Please send me Bulletin RS-4

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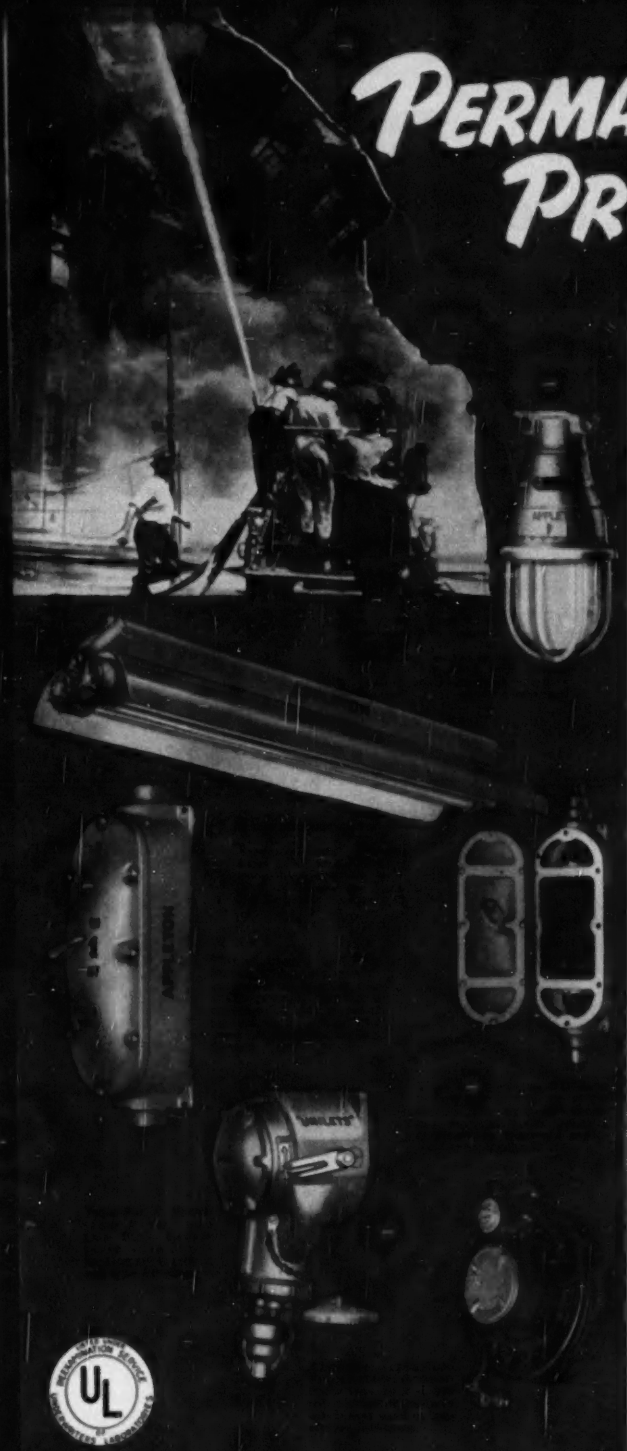

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For Hazardous Locations

Dangers to life and property that lurk in the wiring systems of hazardous locations are permanently eliminated when Appleton Explosion-Proof Equipment is used.

These rugged malleable iron conduit fittings and lighting fixtures confine treacherous arcs that cause fires and explosions in chemical plants, oil refineries, hospital surgeries—all locations where explosive or flamable vapors, dusts or gases are present.

Appleton Explosion-Proof Fittings are strong and unbreakable, roomy, truly threaded and machined, easy to install. And there is an Appleton Explosion-Proof Fitting exactly suited to every explosion-proof requirement.

Any wiring job—explosion-proof or otherwise—is a better wiring job when Appleton Electrical Fittings are used. So save time and build better. Order all your wiring requirements from one dependable source—the 15,000-Item Appleton Line. Write for catalog information.

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CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

YOU CAN BE SURE.. IF IT'S
Westinghouse

Neat Case...

for Residential Distribution

Underground!

It's a neat case that covers the new Westinghouse Semi-Buried Distribution Transformers for modern residential areas.

Because they eliminate the need for unsightly poles, they help you get all the advantages of underground distribution . . . at a cost far below subway-type installations. Easily and inexpensively camouflaged, they enhance real estate values, create good will.

The steel housing locks securely in place on a concrete base that supports the transformer partially below ground level. It can be removed quickly to provide access to terminals. Ventilating grilles and baffles assure adequate cooling, guard against tampering.

Heart of the unit is the Westinghouse Distribution Transformer ("CSP"® or Conventional). This design handles residential services using transformers 50 kva and below. For further information, contact your Westinghouse representative or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70532

Plants at Berkeley Calif.; Denver; Emeryville, Calif; Los Angeles; Portland; Salt Lake City; Seattle; Sunnyvale, Calif.

Westinghouse

DISTRIBUTION TRANSFORMERS

FOR EXPANDING CONTROL SYSTEMS...

A 1-2 PUNCH THAT K.O.'s HIGH COST

1

POLYETHYLENE INSULATION

Thin-wall; small in diameter. Features high dielectric strength, high insulation resistance, low water absorption and good electrical stability. Its low power factor and dielectric constant assure low attenuation, low capacitance, and maximum transmission distance. Especially suitable for circuits operating at carrier frequencies exceeding 50 kilocycles.

Polyethylene insulation! PLASTEX jacket! In Simplex Polyethylene Control Cables this hard-hitting combination provides utilities with a sure-fire means of keeping down the cost while boosting the performance of those steadily-expanding control systems. . . . It results in a cable of unusually small diameter and light weight, allowing more conductors per cable for a given diameter and more circuits per conduit, keeping purchase cost low, and eliminating much of the time and labor needed for installation. . . . It assures low maintenance costs for it provides the electrical and mechanical stability that means long, trouble-free service under all operating conditions. Yes, when you're drawing up plans for new control circuits you can look to this team as a sure bet to knock down costs and keep them down. Why not get complete information now? Simply fill in and mail the coupon below.

2

PLASTEX JACKET

Flexible. Tough. Protects cable against flame, oxidation, water, oil, chemicals, sunlight and weathering. Stable over a temperature range of about two hundred degrees Fahrenheit. Resists cracking down to —58 F.

SIMPLEX WIRE & CABLE CO.
79 SIDNEY ST., CAMBRIDGE 39, MASS.
GENTLEMEN: PLEASE SEND A COPY OF CATALOG 1010 TO:

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SIMPLEX WIRES & CABLES

SIMPLEX WIRE & CABLE CO.
79 Sidney Street
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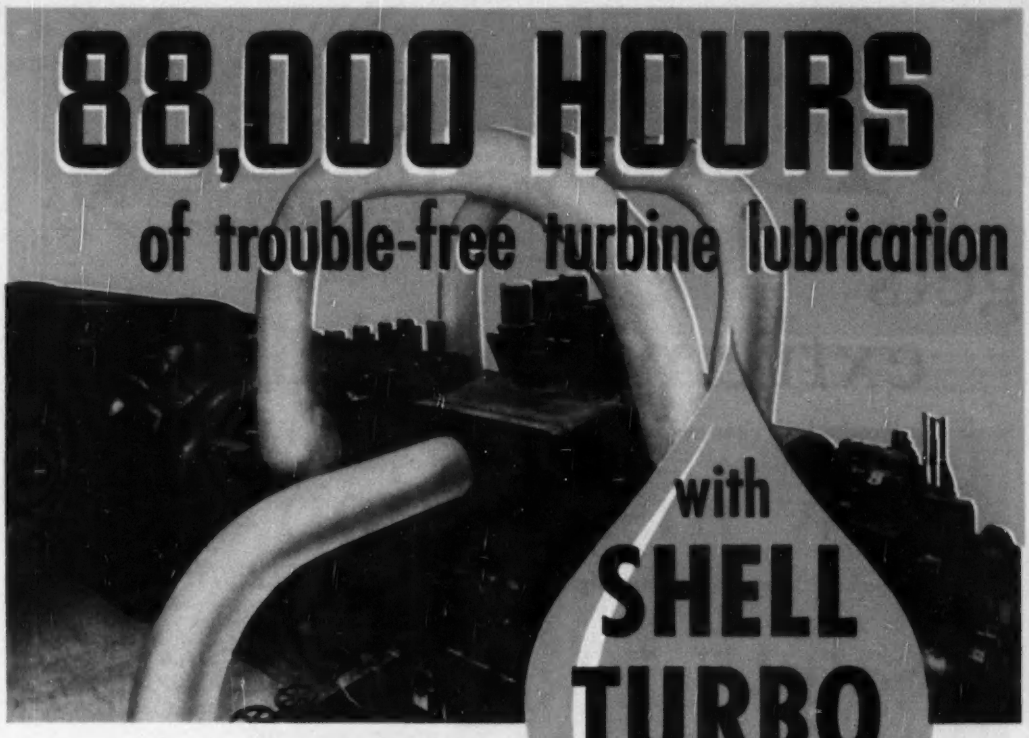
88,000 HOURS

of trouble-free turbine lubrication



with SHELL TURBO OIL

And at last inspection the oil was still in "like new" condition... reports a well-known power company

TYPICAL APPLICATIONS
Where Shell Turbo Oils Can Save on Long Term Lubrication Costs

STEAM TURBINES—Direct connected, geared, pressure circulation, ring oiled

HYDRAULIC TURBINES—Vertical, horizontal. In governor systems, thrust and guide bearings.

HYDRAULIC SYSTEMS—In machine tools; hydraulic presses and other oil-hydraulic power equipment.

BEARINGS—Plain and anti friction—where severe conditions or other factors point toward use of oxidation resistant oil.

Also recommended for extra heavy duty air compressor lubrication

THE ABOVE is not just an isolated case. Other power companies, shipping companies, operators of all kinds of turbines testify to amazingly long, trouble-free lubrication from Shell Turbo Oil. And to significant savings in operating costs.

Shell was first to see the need for a *completely* fortified turbine lubricant . . . first to develop an oil with the *extra* properties it must have to give such service . . .

Non-Sludging: In service, that means piping, coolers, reservoirs stay clean.

Rust-Preventing: Governors are fully protected, oil systems stay free of deposits.

Non-Foaming: To maintain sensitive governor operation . . . to eliminate all the troubles that excessive foaming can cause.

No matter what type of turbine you operate . . . steam or hydro, stationary or marine, in power generation or mechanical drive . . . you can count on long, trouble-free lubrication with Shell Turbo Oil. *Money-saving lubrication.*

SHELL

Macy's

San Francisco

gets

extreme flexibility

to handle load changes and future load growth

low installation cost

everything was shipped complete—as a unit—and easily installed

safety to personnel

no exposed circuits; metal encloses all current-carrying parts

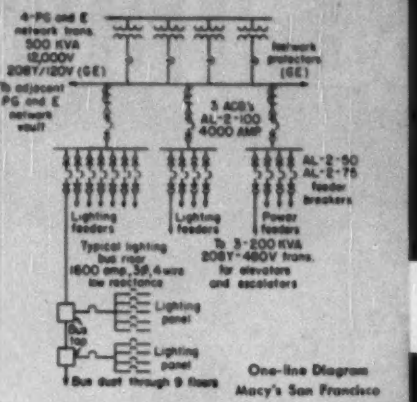
plenty of "IC"....with

100,000 amperes interrupting capacity, adequate to handle all short circuits

GENERAL ELECTRIC

HERE'S WHY . . . "In the department store business we cannot take any chances with power outages or potential fire hazards. We must also plan for expansion. That's why we wanted our power distribution system to be safe, to have adequate feeder and branch-circuit capacity, plus flexibility. General Electric switchgear gave us all these requirements."

E. L. MOLLOY, VICE PRESIDENT
MACY'S, SAN FRANCISCO

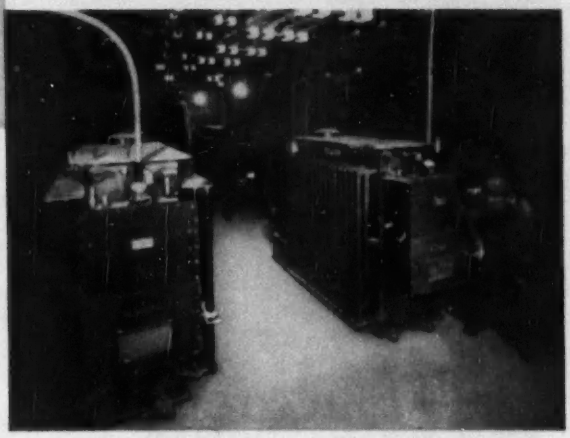

4-PG and E network trans. 500 KVA 12,000V 208Y/120V (GE)
To adjacent PG and E network vault
Network protectors (GE)
3 ACB's AL-2-100 4000 AMP
AL-2-50 AL-2-75 feeder breakers
Lighting feeders
Lighting feeders
Power feeders
Typical lighting bus riser 1600 amp, 5ø,4 wire low reactance
To 3-200 KVA 208Y-480V trans. for elevators and escalators
Lighting panel
Bus tap
Lighting panel
Bus duct through 9 floors

One-line Diagram
Macy's San Francisco

This, the largest switchgear installation to date in any San Francisco commercial building, adequately handles the power requirements that average four watts per square foot (nearly 500,000 square feet). Flexibility of the feeder system permits load changes without increasing the load on the switchgear. The 4000-ampere breakers have induction relay tripping.

Macy's installation is a complete General Electric project—switchgear, three 200-kva transformers for elevators and escalators, power and lighting panels, motors, and control for ventilating and boiler-room auxiliaries. One source of responsibility plus the very best in co-ordinated planning, engineering, manufacturing, and service facilities to give maximum savings and efficiency to the customer. William D. Day, San Francisco, architect; Clyde E. Bentley, San Francisco, consulting engineer.

G-E metal-enclosed switchgear handles the incoming 120/208-volt power. The equipment is divided into three sections, two for lighting, one for power. Breakers (cascaded) are of the drawout type for ease of inspection and maintenance.



Four G-E network units, rated 500 kva, 12,000-120/208 volts in a Pacific Gas and Electric Company vault serve the building. Macy's 2500-kva load represents one of the largest loads added to PG&E's downtown network in recent years.

low-voltage SWITCHGEAR

Modern industrial power distribution systems using G-E switchgear are applicable to any industrial plant or commercial building where you want proper voltage for top performance of equipment, an extremely flexible setup to take care of expanding or changing loads, adequate short circuit protection, safety to personnel, and low installation and maintenance costs.

Be sure to see the "More Power to America" full-color sound slidefilm "Modern Industrial Power Distribution." Ask your G-E sales representative to arrange a showing for your organization.

Investigate today the many advantages of using General Electric switchgear in *your* plant for efficient, flexible power distribution. Contact your G-E sales representative for further information—and write for the helpful bulletins listed below. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

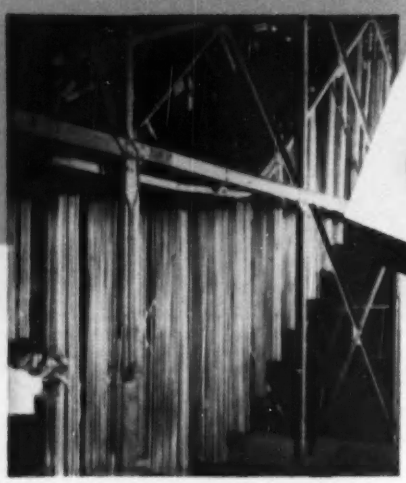
GEA-4966 Low-voltage Switchgear
GEA-3642 Air Circuit Breakers
GEA-2017 Network Protectors
GEA-3083 Metal-clad Switchgear
GEA-3592 Load-center Substations
GEA-3758 Load-center Distribution

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Because IT MUST BE RIGHT

You can count on TRIANGLE HOT-DIP GALVANIZED STEEL CONDUIT



Lasting Protection — Smooth and uniformly hot-dip galvanized inside and outside, Triangle rigid steel conduit is dipped into special lacquer and baked in this endless conveyor equipment.

Your own experience tells you that conduit fails where the galvanizing is thinnest. That's why Triangle's *uniformity* is important to you. For the severest service, where a single pin-point of penetration could open the way to rapid rust and early failure, users upon users repeatedly specify Triangle conduit. That's why you see more and more "Tristeel" flexible steel conduit, more and more Triangle E.M.T. and rigid steel conduit being used throughout refineries, on bridges over salt water, in increasing numbers of industrial plants. Users' own impartial laboratory tests have repeatedly proved the superiority of Triangle—the conduit that's *uniformly* hot-dip galvanized . . . inside and outside . . . and then further protected by an exclusive new lacquer formulation!

Prove to yourself—in your own laboratory, or on your toughest jobs, that Triangle is the conduit you can count on!

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TRIANGLE CONDUIT & CABLE CO., INC.

1904 JERSEY AVENUE • NEW BRUNSWICK, NEW JERSEY

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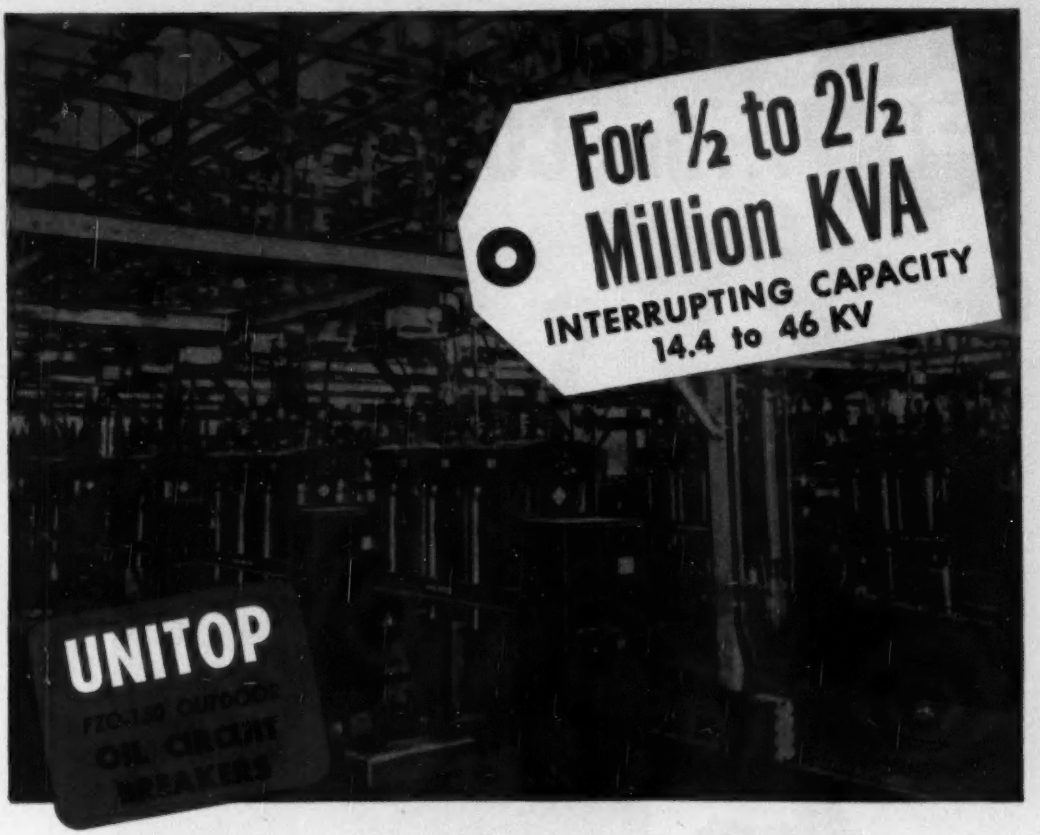
Catalog No. 500 Gives Full Details Of the Complete Triangle Line

"Glazon" & "Trioseal" Building Wire • "Tricon" Control Wire • "Adaptol" General Purpose Wire • "Triwal" Non-Metallic Sheathed Cable • "Trioprene" Trench Cable • Service Entrance, Parkway, Power & Varnished Cambric Cables • "Tristeel" Flexible, Thin Wall & Rigid Steel Conduit



MECHANICALLY TRIP-FREE PNEUMATIC OPERATOR *assures positive tripping*

***UNITOP* FRAME CONSTRUCTION** *eliminates dirt-and-moisture-collecting crevices*

SINGLE-BREAK *RUPTOR* INTERRUPTING DEVICE *for low arc energy release*

HERE'S HOW the Allis-Chalmers pneumatic operator with mechanically trip-free design assures instant tripping under any conditions. *On a fault, the operator is mechanically unlatched from the tripping mechanism.* By isolating tripping and closing mechanisms in this way, the tripping force doesn't have to work against valves or back pressures of any kind. This positive tripping action is a standard feature on all FZO-150 breakers.

COMPLETE WEATHER PROTECTION

One-piece, continuous heavy steel *Unitop* construction eliminates crevices that collect dirt and moisture. All three poles, under one top, are completely protected against severe weather conditions. Wiring is carried in sealed ducts within the top frame.

FAST, EFFICIENT INTERRUPTION

Arcs are quickly extinguished with simple, single-break *Ruptor* interrupting device. No unnecessary moving parts to bind or fail. Self-wiping, self-aligning contacts prevent formation of high resistance oxides, have low temperature rise.

Every FZO-150 breaker is factory assembled and tested, then shipped without dismantling so that test performance will be met in the field.

For details on the FZO-150 (bulletin 71B6421A) or other breakers to meet any utility need, contact your nearby A-C sales office. A-5072

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

STANDARD RATINGS
8 cycle interruption

Rated KV	Max. Design KV	Rated Amps. (60 cycle)	Kva. Interr. Cap.
14.4	15.5	1200	1,000,000
14.4	15.5	2000	1,500,000
23.0	25.8	1200	500,000
34.5	38.0	600	500,000
34.5	38.0	1200	1,000,000
34.5	38.0	1200	1,500,000
34.5	38.0	2000	2,500,000
46.0	48.3	600	500,000
46.0	48.3	1200	1,500,000

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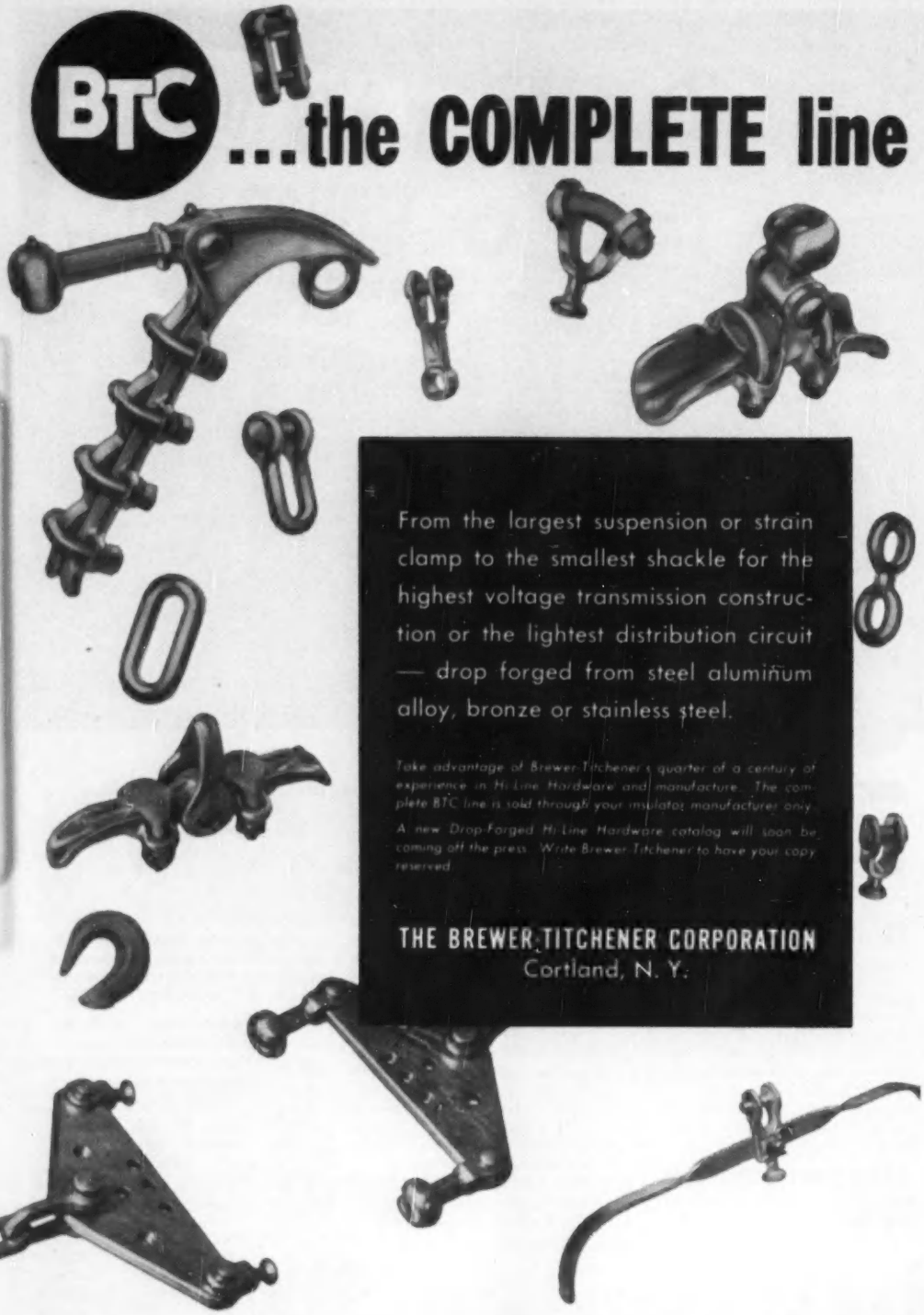
ALLIS-CHALMERS

BTC ...the COMPLETE line



From the largest suspension or strain clamp to the smallest shackle for the highest voltage transmission construction or the lightest distribution circuit — drop forged from steel aluminum alloy, bronze or stainless steel.

Take advantage of Brewer-Titchener's quarter of a century of experience in Hi-Line Hardware and manufacture. The complete BTC line is sold through your insulator manufacturer only.

A new Drop-Forged Hi-Line Hardware catalog will soon be coming off the press. Write Brewer-Titchener to have your copy reserved.

THE BREWER-TITCHENER CORPORATION
Cortland, N. Y.

Distribution and Operating Engineers...

Reduce your voltage survey costs with low-cost, permanent

MiniMax

Voltmeter Installations!

Lincoln Type V-2S Indicating Voltmeter

You save money two ways by using the new MiniMax Indicating Voltmeter. It makes the use of graphic meters unnecessary in most cases, resulting in appreciable savings in meter investment; and when permanently installed, it saves the heavy labor cost of periodic surveys.

The Lincoln Type V-2S MiniMax voltmeter, time-lagged so that instantaneous values caused by sporadic conditions are not shown, is equipped with a maximum and a minimum voltage indicator on either side of a pusher pointer which is fixed to the actuating element of the meter. The pusher pointer spreads the indicators apart with changes in voltage. These indicators show the 10-minute averages of minimum and maximum voltages which have occurred since the last resetting. The pusher pointer shows the average voltage at any time.

Maximum return from existing distribution equipment results from systematically applied voltage control. Simple changes in the distribution system, such as transferring loads between transformers, changing transformer taps, balancing loads, resectionalizing, and adding transformers and regulators—often result in greater kilowatthour consumption and increased revenues. For the most effective results—at the lowest cost—make these changes on the basis of continuous voltage information provided by permanently installed MiniMax voltmeters.

Type V-2S MiniMax voltmeter, shown at left, can be installed in a standard meter socket, outdoors. Meter scales are available for voltage ranges of 95 to 135 volts, or 190 to 270 volts. The graphic form—Type CCV, at right provides a continuous record of average voltage. Bulletin 483 gives full information.

SANGAMO

ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

ANNOUNCING

FOR MERCHANDISING ACCOMPLISHMENT

In announcing the Hughes Award for 1950, Hotpoint again looks at Tomorrow Today. Hotpoint believes that the advancements made *today* in the field of electrical appliance merchandising will be reflected *tomorrow* in better living for American people.

Each progressive merchandising step reaps its reward in the strengthening of the bond between the users of electricity and the makers of electricity. Adroit merchandising keeps alive the spirit of both cooperation and competition, without which, progress is impeded.

As the electrical industry moves forward, so does its service to its customers. Skillful merchandising then, is the implement by which greater values are placed in its customers' hands.

And so, Hotpoint again is proud to announce the 1950 Hughes Awards.

"Through the continued sponsorship of these Awards, Hotpoint foresees recognition of far greater accomplishment than the years just past have offered. The Hughes Awards of the future will record an era of electrical living that, as of today, has only barely started."

President
Hotpoint, Inc.

• • • The 1950 Hughes Awards

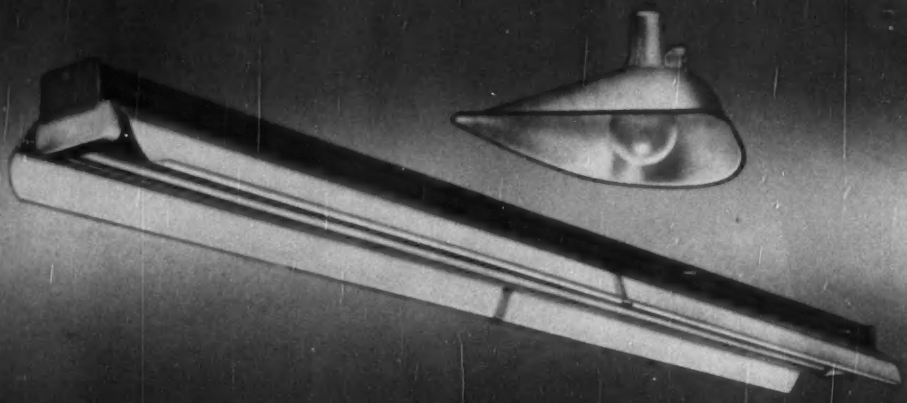
AMONG ELECTRIC UTILITY COMPANIES

A full description of the 1950 Hughes awards, their purposes and their prizes will be sent upon request. Write Utility Division, Hotpoint, Inc., 5600 W. Taylor Street, Chicago 44, Illinois.

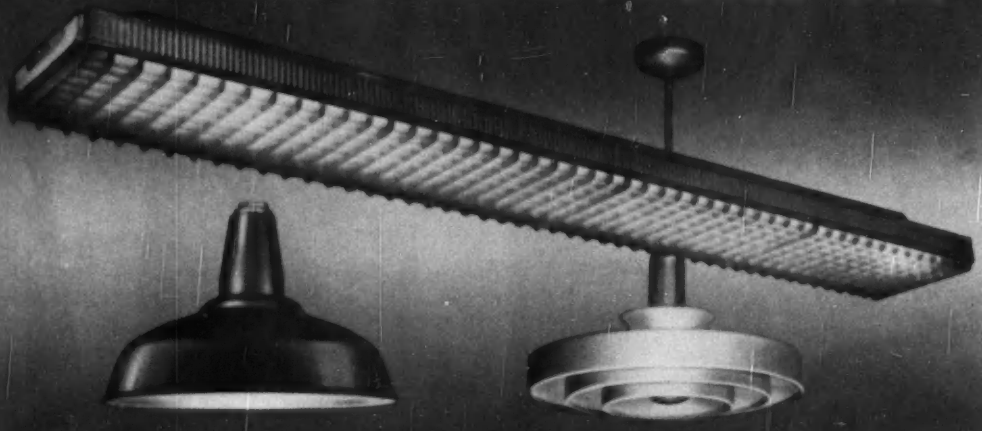
Hotpoint Inc.

(A GENERAL ELECTRIC AFFILIATE)

PLANNED LIGHTING FOR ALL



COMMERCIAL, INSTITUTIONAL AND



INDUSTRIAL INSTALLATIONS

ILLUMINATION EQUIPMENT
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA
MADE IN U.S.A.

OFFICES IN PRINCIPAL WESTERN CITIES · BRANCH AND WAREHOUSE IN SAN FRANCISCO

YOU CAN BE SURE.. IF IT'S
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A New 100-AMPERE Type GR Recloser...

For Rural and Suburban Distribution

- 100 amperes—continuous current rating
- 2,000-2,500 amperes—interrupting rating
- Full 15-kv insulation (110-kv impulse withstand)
- Interrupts 2,000 amperes with full 15 kv across one pole
- Heavy top casting and deep-drawn tank—both heavily hot-dip galvanized
- One fast, and three time-delay openings, or four time-delay openings
- Bushings, mechanism, hangers—all interchangeable with 50-ampere series
- Five coil sizes available—25, 35, 50, 70, 100

The 100-ampere GR Recloser is available for immediate delivery now. Use it to provide complete, economical protection for your rural *and suburban* lines. For complete information, ask your Westinghouse representative or distributor for Bulletin B-4339, Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60721

GR RECLOSERS

Plants at Berkeley, Calif.; Denver; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Sunnyvale, Calif.

Protect the plant and

with CROUSE-HINDS

.....bells, horns, sirens, and visual signals

Raintight signals for non-hazardous locations

The most complete line

Type SSR Raintight Horn with Bell

Type MR Raintight Horn with Single Projector

Type MR Raintight Horn with Double Projector

Type PR Raintight Pilot Light Condulet

Continuous production is of vital importance in successful plant operation. Costly shutdowns can often be avoided by Crouse-Hinds signals that give an instant warning of abnormal operating conditions or sound an alarm in case of fire.

A wide variety of signals is necessary to meet the varied conditions in industry. Crouse-Hinds offers a comprehensive line of signaling devices for plant protection and communication ..... sirens, horn, bells, and visual signals. Each unit is designed with individual characteristics that make it superior for a particular kind of service. There are Crouse-Hinds signals for use in non-hazardous locations; raintight signals for use where exposed to the weather; explosion-proof and dust-tight signals for use in hazardous locations; signals with a low volume of sound and high power signals that are extremely loud.

You have a definite advantage in selecting signals from the all-inclusive Crouse-Hinds line. It is possible for you to meet the requirements of every location. In noisy areas the character of the noise is of first importance. A signal producing a sound having the greatest contrast to the area noise should always be selected. For example, a horn would not be suitable in

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Syracuse 1, N.Y.

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First in the field
STANDARD OF QUALITY

CONDULETS · TRAFFIC SIGNALS · AIRPORT LIGHTING · FLOODLIGHTS

maintain continuous production

Signaling Devices

for control of operations, and fire protection.

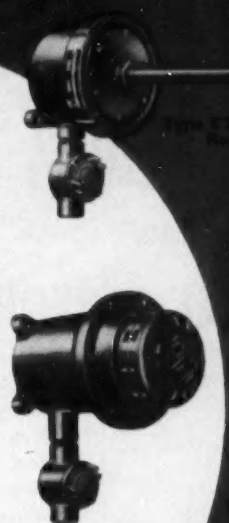
of explosion-proof and dust-tight signals for hazardous locations

surroundings where a constant hum or whine is present but a bell could readily be heard. A bell would be inadequate in surroundings where the noise is produced by hammering on metal but a horn would give the required contrast.

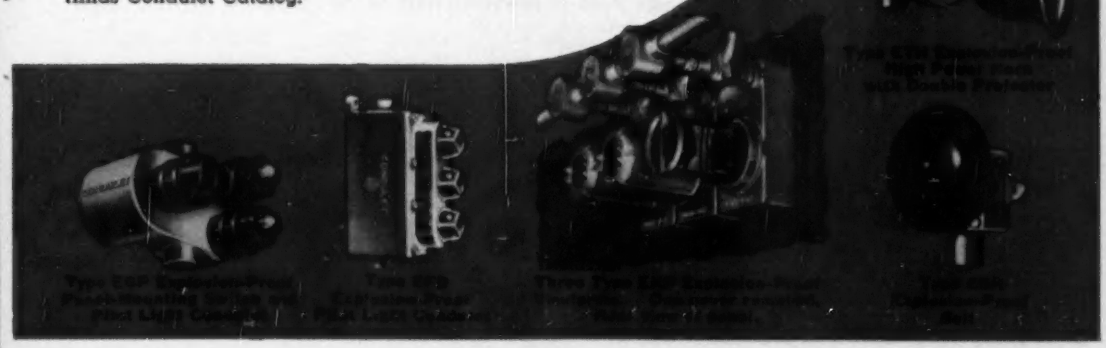
Careful consideration should also be given to the number of signals required. In general, much better coverage is obtained by even distribution of several low output units than by one or two high output units. On the other hand, a high powered unit is necessary when the sound must be projected a considerable distance from one location.

Crouse-Hinds' line of visual signals includes a variety of pilot lights and also the Visularm, a compact unit used to supervise manufacturing processes. The Visularm will automatically indicate normal and abnormal temperature, liquid level, speed, load, or any other condition which can be electrically coupled to the circuit. An independent circuit is provided in the Visularm to actuate an audible signal.

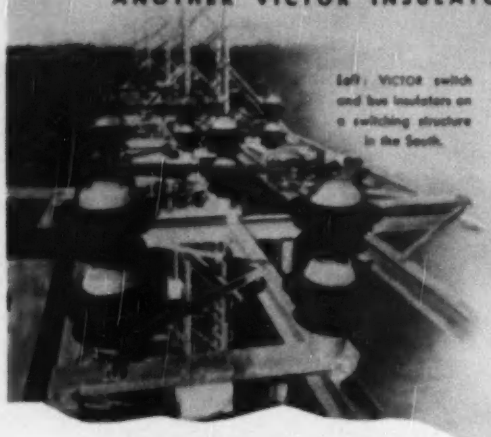
In Crouse-Hinds' complete line there are dozens of different units from which to choose the items to meet your particular requirements. They are all listed in the Crouse-Hinds Condulet Catalog.



Type ETH Explosion-Proof Siren



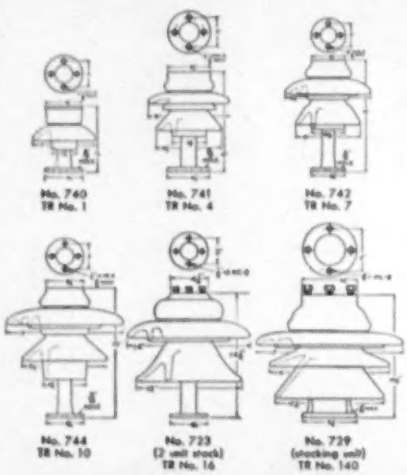
ANOTHER VICTOR INSULATOR THAT SAVES AS IT SERVES



Left: VICTOR switch and bus insulators on a switching structure in the South.

Install VICTOR Switch and Bus Insulators and see how

TROUBLE-FREE PERFORMANCE REALLY PAYS OFF!



THE number of service-years built into any switch and bus insulator can be determined *only by actual performance data*—data obtained from *all* types of station installations subject to *all* kinds of conditions. And, because of their rugged, heavy-duty construction, that is where VICTOR switch and bus insulators rate *high!* Facts prove VICTOR switch and bus insulators *retain* their original high standards even after many years of severe service. This means *fewer* replacements and *lower* maintenance costs. Find out how much trouble-free performance can *save* you—*standardize* on VICTOR switch and bus insulators.

Ready soon! *A new condensed VICTOR Catalog for handy reference. Write us now and reserve your copy.*

Get All the Facts! **REPRESENTATIVES IN THE FOLLOWING WESTERN CITIES:**

Los Angeles, Cal.	Seattle, Wash.	Salt Lake City, Utah
San Francisco, Cal.	Spokane, Wash.	Denver, Colo.
Portland, Ore.	Boise, Idaho	Phoenix, Ariz.

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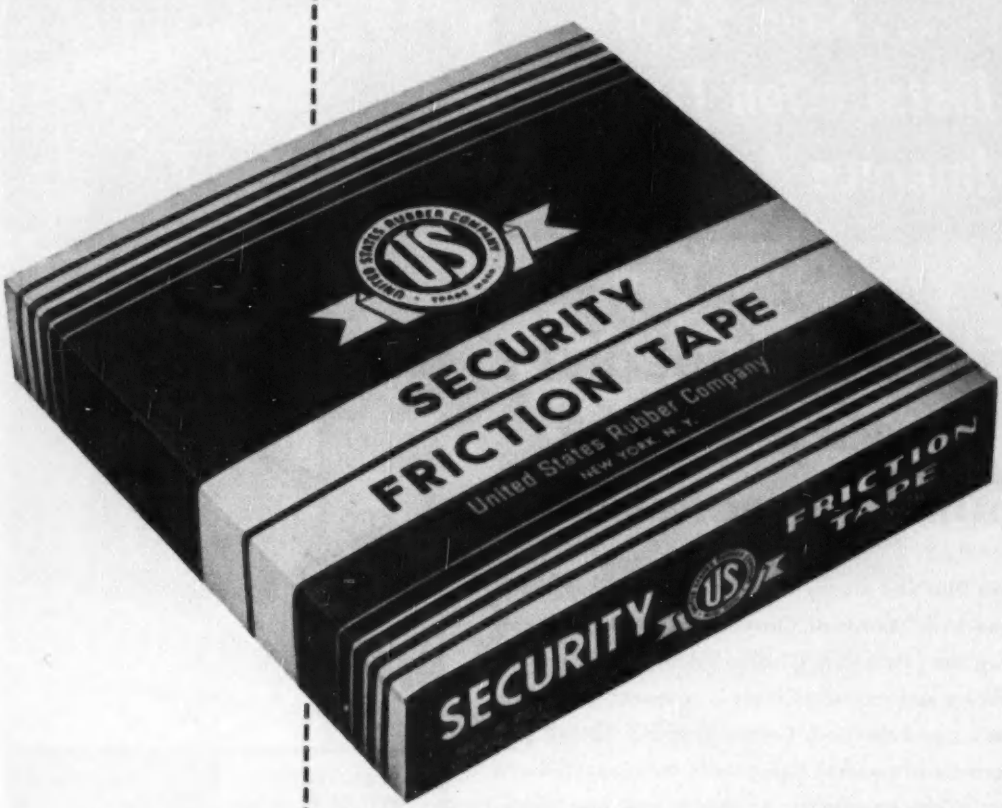
INSULATORS Inc.
VICTOR, NEW YORK

Look for this trade mark of enduring service

V

A SAFE AND STEADY SELLER



"SECURITY"—THE FRICTION TAPE MADE BY

Instinctively—electrical contractors reach out for things they know and trust.

They trust "Security" because they *know* it stands up in service. It has high tensile strength. It is free of pin holes. It does not unravel when unwound from the roll. It tears straight. And it has a strong, rubbery adhesive that sticks and *holds*.

Is your stock of Security adequate?

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SERVING THROUGH SCIENCE

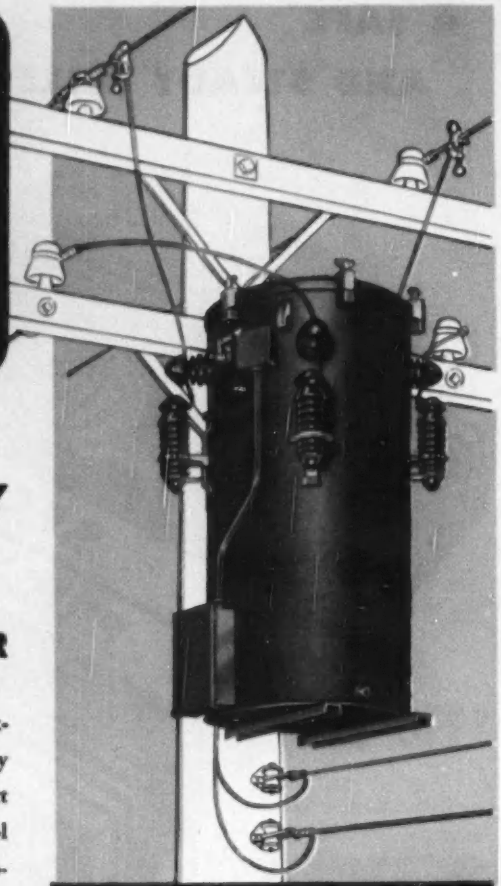
UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Cut Installation Costs . . . Save 2/3 of Installation Time . . . Improve Appearance

WITH

THE NEW MOLONEY "packaged-unit" CONSTANT CURRENT TRANSFORMER



Save time and money with the new Moloney "Packaged-Unit" Constant Current Transformers. Simply hang the "Packaged-Unit" on the pole . . . connect primary and secondary leads . . . connect the control line . . . *and that's all!* Comes complete with all protective and control equipment incorporated as a part of the transformer to permit unit installation. No separate installations of lightning arrestors, primary fuse cutouts, oil switches or protective relays.

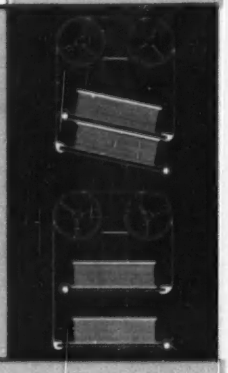
Write today to Moloney Electric Co., St. Louis 20, Mo., for Bulletin SL-702 giving complete information.

Sales offices in all principal cities

WEEC-4

EXCLUSIVE MOLONEY FEATURE

Both coils move on Moloney transformers. Each coil moves only half the distance required by the moving coil of a single-moving-coil type regulator, on starting or during changes in load. This means quicker response . . . longer lamp life. Diagram shows starting position (above) and half load position (below). Bottom and top coil move apart simultaneously.



MOLONEY ELECTRIC COMPANY

FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONTARIO, CANADA

MOLONEY M ELECTRIC

Lighting Solutions at Your Fingertips

New G-E lighting solution sheets help you lay out jobs, clinch sales!

IF you've ever wanted a clear, simple solution to a lighting problem, these new sheets are for you! If you've ever wanted some easy-to-understand lighting pictures and diagrams to show specific prospects, in terms of their own businesses, these sheets are your answer! They cover many types of installations—stores, factories, offices, schools, public buildings and others, and they're all punched and ready for your notebook.

Each sheet has a large photograph of an installation, a diagram giving all important dimensions, and a short description of equipment and the results achieved.

A set of these handy solution sheets is yours for the asking, at no cost or obligation of any kind. Just fill in and mail this coupon today.

FREE LIGHTING SOLUTIONS

General Electric Co., Lamp Dept., Div. 166-EW-5, Nela Park, Cleveland 12, Ohio:

Please send me at no cost or obligation a selection of your free lighting solution sheets.

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GENERAL ELECTRIC

How Would You

THE COMPONENTS OF A SINGLE CIRCUIT UNIT SUBSTATION?

Would You Design a Housing, Then Squeeze In the Components? Or Would You Build the Transformer and Switchgear Individually—and Design the Housing to Contain Them?

OF COURSE you would arrange your substation *functionally* . . . the *only* way to design a modern unit substation. And certainly you would make all switchgear components *accessible* . . . for ease of inspection and maintenance.

Here is how Allis-Chalmers designs *SCS* Unit Substations to give you functional arrangement and maximum accessibility!

1. Transformer and switchgear are divided into two independent sections, both contained in the single substation housing.

2. All switchgear components — including potential transformers, current transformers and control power transformers — are grouped in one section. Potential and control power transformers are draw-out mounted for easiest inspection, testing maintenance, or replacement.

3. Meters, relays and controls are dead-front mounted behind the front door for accessibility and safety.

4. The single rear door is hinged for quick, convenient access to internal power connections . . . testing and inspection are made easy . . . gasket maintenance reduced.

WHAT CAN THIS *FUNCTIONAL, ACCESSIBLE* DESIGN MEAN TO YOU?

First — Lower Maintenance. Easily accessible components reduce time and effort required for servicing.

Second — Easier Testing and More Thorough Inspection because components are in a compact arrangement, highly accessible.

Third — Greater Safety. Operators and meter readers have access only to the dead front controls.

To learn more about these *modern appearing* SCS Unit Substations and how they can be quickly fitted into your distribution system, call your nearby Allis-Chalmers Sales Office. A-5027

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

SCS is an Allis-Chalmers trademark.

ALLIS-CHALMERS FORMULA FOR SINGLE-CIRCUIT UNIT SUBSTATION DESIGN:
ACCESSIBILITY + FUNCTIONAL ARRANGEMENT
= ✓Easier Maintenance ✓Simplified Testing & Inspection ✓Greater Safety!

Arrange

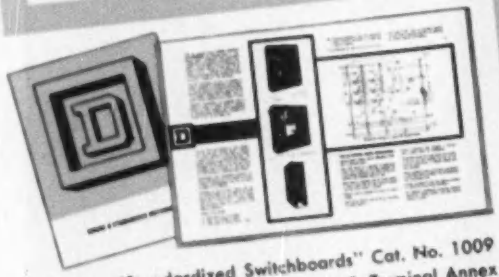
ALLIS-CHALMERS

Pioneers in Load Ratio Control — Originators of 5/8% Step Regulation

MAXIMUM FLEXIBILITY with STANDARDIZED SWITCHBOARDS

Square D Standardized Switchboards are the result of an intensive study by nationally recognized Industrial Designer Walter Dorwin Teague. Square D Engineering know-how made it possible to incorporate the desirable characteristics of all types of switchboards in one basic design.

DEPENDABLE INTERCHANGEABLE



Square D Standardized Switchboards are manufactured in sections of a number of standard widths. The height of sections is uniform. The combinations of various sections make a complete switchboard for varied uses in a sturdy, attractive, space-saving enclosure.

Write for "Standardized Switchboards" Cat. No. 1009
Square D Company • Box 2115, Terminal Annex
Los Angeles 54, California

SQUARE D COMPANY

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YOU CAN BE SURE... IF IT'S
Westinghouse

This flashover of a horn gap illustrates the kind of power available at the High Power Laboratory . . . power of sufficient magnitude to verify designs for interrupting fault current as high as 10,000,000 kva.

Here's *SURENESS*... in the Making!

Sureness doesn't spring from skillful engineering and quality manufacturing alone. It takes testing, too . . . rigid design testing on a scale equaling the severest kind of service conditions. Fault currents of tremendous magnitude, sub-zero weather, severe icing conditions, searing flashovers . . . these are only a few of the tests given every new Westinghouse design.

This business of making *sure* . . . of anticipating and duplicating every conceivable service condition, is the work of the Westinghouse High Power Laboratory . . . for 25 years the proving ground for all Westinghouse electrical apparatus. This is where we make *sure* . . . and this sureness is passed along to you. It backs up every Westinghouse label, whether it appears on a tiny switch, a giant circuit breaker or the world's largest lightning arrester. J-60697

SEE FOR YOURSELF!

Booklet B-4383 describes facilities, procedures and actual tests conducted at the Westinghouse High Power Laboratory. Ask your Westinghouse representative for a copy of B-4383, or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa.

Westinghouse
HIGH-POWER
LABORATORY

Plants at Berkeley, Calif.; Denver; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Sunnyvale, Calif.

Johns-Manville Announces Two New

Smooth layers of Quinterra Type 6 Electrical Insulation **(Twin-ply)**, *used in winding a Marcus dry-type transformer*

Quinterra

TYPE 6 (TWIN-PLY)

A new cost-reducing, high-temperature insulation that prolongs transformer life many times through its resistance to pyrolysis

Here is a radically new asbestos-base, continuous-sheet, paper-like electrical insulation that offers many economies. It is primarily intended for interlayer and wrapper insulation in windings and coils used in Class A and B transformers (internal hot-spot temperatures 130C, or higher if special varnishes are employed).

Quinterra Type 6 is plied at the factory by welding two layers of Quinterra and calendering them into a dense, strong and smooth-surfaced insulation having good tensile and bursting strengths. For economical application with a minimum of waste, Quinterra Type 6 is furnished in continuous rolls cut to exact widths.

Excellent handling properties

Uniformity of physical and handling properties enables assemblers to achieve production rates such as are attained with the best types of interlayer and wrapper insulations. Further economies result from the large square-foot-per-dollar coverage.

Excellent constructional advantages

The plied construction of Quinterra Type 6 offers two distinct constructional advantages: (1) It provides better dielectric protection than a single layer. (2) Under stress, the weaving strains within coil structures are less likely to damage a plied insulation than a single-layer insulation.

Excellent dielectric-thermal characteristics

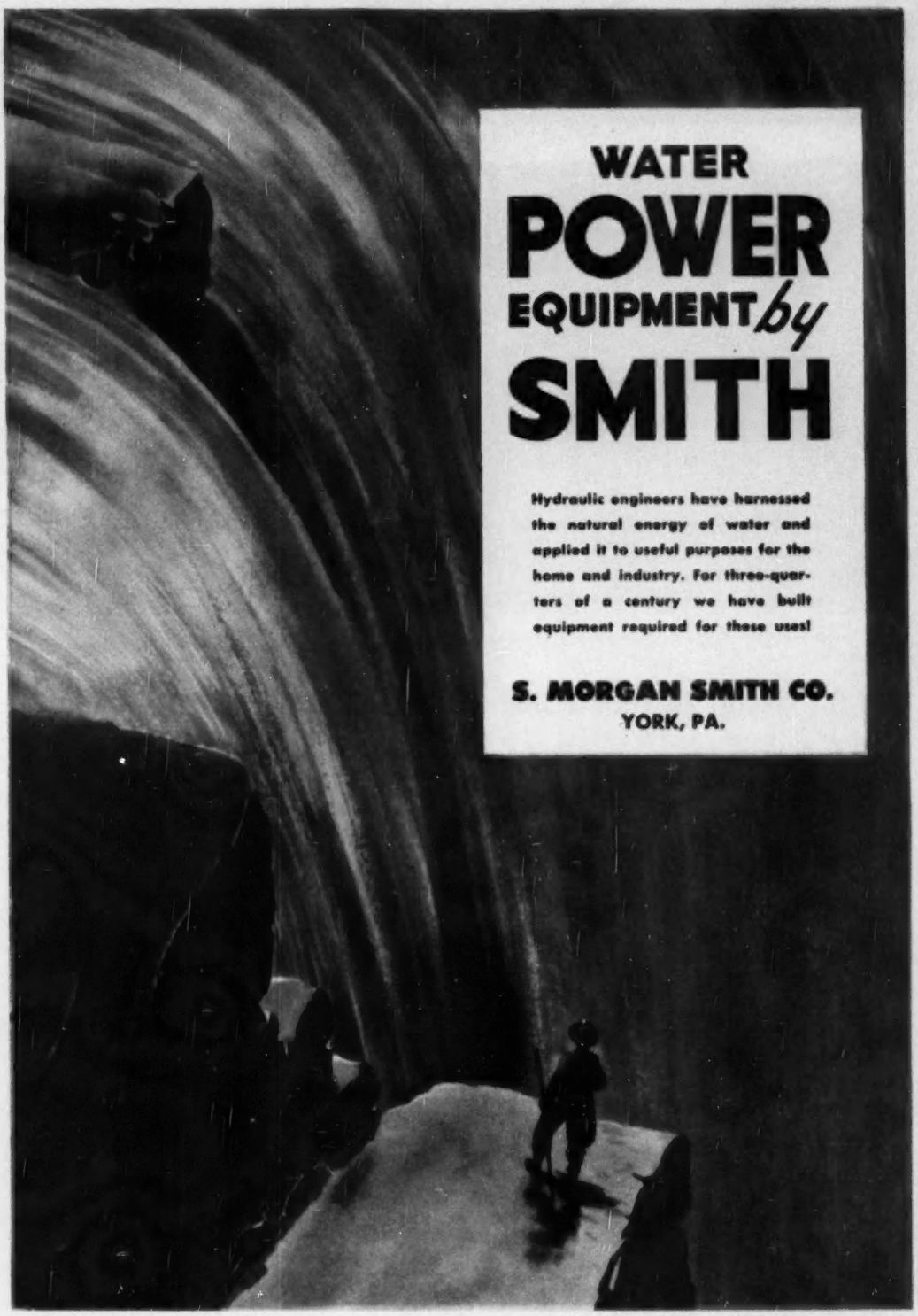
The base sheets of all Quinterra products are made 100% inorganic, but, for mechanical reasons only, are saturated with an organic resin. At room temperature (ASTM conditions) Quinterra Type 6 averages in excess of 550 VPM. After prolonged exposure at 175C, long after the thermoplastic saturant is driven off, it still maintains its original dielectric strength and requires only the re-establishment of its varnish protection to provide a further useful life cycle.

We will be glad to provide you with samples and further information about Quinterra Type 6 Electrical Insulation. Write Johns-Manville, Box 290, New York 16, N. Y.

Weights and thicknesses of Quinterra Type 6

Thickness ±10%	Weight Per 100 sq ft ±15%	Approx Coverage sq ft lb
.0045"	2.5	40
.006"	3.3	33
.007"	3.8	26
.008"	4.5	22
.009"	4.8	20
.010"	5.5	18
.012"	6.3	16
.015"	7.2	14

Johns-Manville


WATER
POWER
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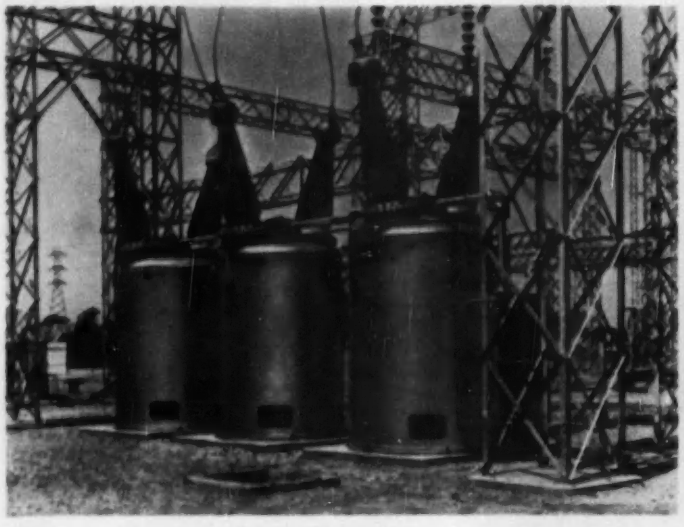
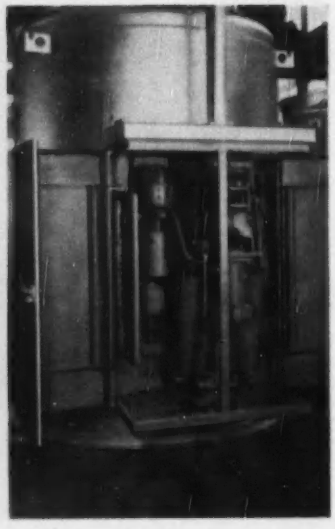
SMITH
Hydraulic engineers have harnessed the natural energy of water and applied it to useful purposes for the home and industry. For three-quarters of a century we have built equipment required for these uses!
S. MORGAN SMITH CO.
YORK, PA.

PRODUCT NEWS



Pacific Electric type RHE oil circuit breaker 196/230 kv., 3-cycle opening



Operating mechanism for new breaker

NEW OIL CIRCUIT BREAKER DESIGN GIVES HIGHER INTERRUPTING RATING

(1) Pacific Electric Mfg. Corp., 5815 Third St., San Francisco, California

Bus simplification and other operating economies point to the desirability of using circuit breakers for main bus protection that are capable of interrupting the largest concentration of power available at the site. Until recently, the maximum standard circuit breaker rating of 3.5 million interrupting kva. was adequate for this purpose on 230-kv. lines.

Load expansion and interconnection, however, have since raised this limit until some locations now justify the use of circuit breakers of two or three times this rating. Increase of system stability limits also indicates the need for circuit breakers that will interrupt within three cycles as compared with the former minimum of five.

Designed to conform to these requirements, the Pacific Electric Type RHE line of circuit breakers is announced in the voltage range from 115 kv. to 230 kv. with interrupting rating to 5 million kva. at 115 and 138 kv., to 7.5 million kva. at 161 kv., and to 10 million kva. at 230 kv. Interrupting time is within 3 cycles from energizing trip coil; closing is within 10 cycles; reclosing is rated at 20 cycles, though is adjustable in the field from 15 to 45 cycles. Reclosing does not start until the blades attain full-open position.

The circuit breaker is claimed to interrupt to full rating without apparent distress or jar on foundations, a result obtained by use of new interrupters that were tested at the Grand Coulee switchyard in June 1948, when 9.6 million kva. was interrupted on 3-phase ASA basis.

Entrance bushings are attached to the tanks through adjustable spherical-type metal-to-metal joints. The moving contact structure is of the single-unit rotary type, providing six breaks in series per pole. Each blade enters a group of four sliding-shoe contacts, all of which carry load current; arcing is confined to one contact but upon a different surface than that carrying load.

Since the blade speed is adequate without use of linkage-multiplying devices to increase rate of contact parting, there are no moving parts within the tank other than the one-piece rotary structure. Voltage-division between the multibreak contacts is provided by capacitance shielding.

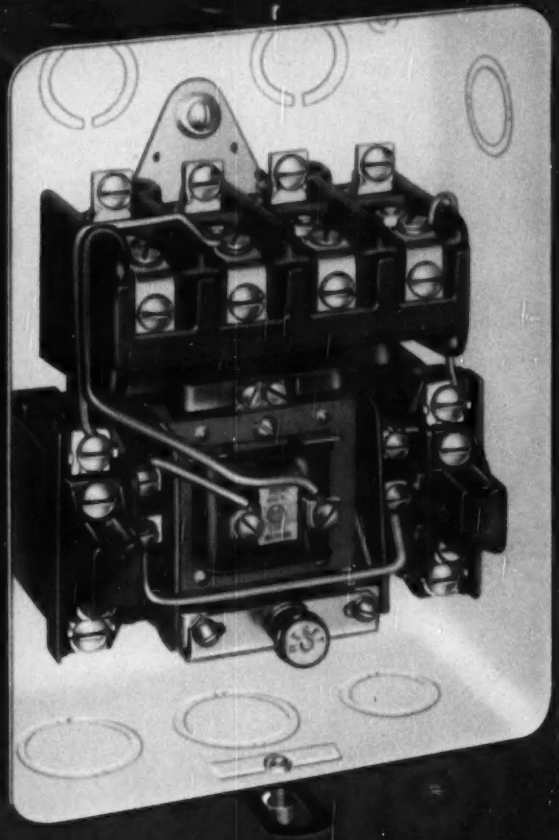
Opening forces are from kick-off springs on the tank tops; closing force is transmitted from an end-mounted operating mechanism through pull rod which has means of compensating for the variable stretch to the respective poles—to insure simultaneous operation at the three poles.

Closing springs are compressed by oil-hydraulic means operated from motor pump, requiring 10 seconds. Should control power fail, the springs may be compressed by hand pump, requiring two minutes. The opening and closing latches embody new developments which it is claimed prevent disengagement except at proper times. The electrical system has been simplified as compared with former standards; for example, the no-pumping relay is eliminated. Instead, a simple mechanical interlock performs the equivalent function.

The circuit breaker is electrically and mechanically trip-free in any position and is manufactured and tested according to AIEE, ASA, and NEMA applicable standards.

Imitation is the sincerest of flattery

Charles C. Colton



WHY...

do so many starters look like Allen-Bradley Solenoid Starter

ALLEN-BRADLEY CO.

1314 S. Second St., Milwaukee 4, Wis.

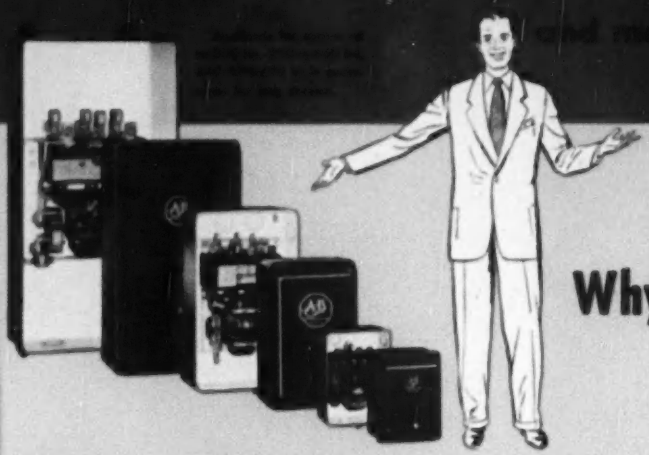
ALLEN-BRADLEY

THE MOST IMITATED MOTOR STARTER

QUALITY

A-B Quality

"preferred" starter



Why?

- It's so simple
- It's so trouble free
- It's so easy to install
- It's so dependable

BULLETIN 709 Solenoid Starter

The world's simplest and most popular magnetic across-the-line starter

The dominant position of Allen-Bradley solenoid motor controls among machinery builders, plant engineers, and electrical contractors, has been revealed in repeated market surveys during the past 10 years.

These strong preferences . . . for Allen-Bradley starters . . . are due primarily to the four unique design features tabulated on this page.

Allen-Bradley starters rank first, year after year, among machine tool manufacturers . . . the most exacting control market in the world . . . because Allen-Bradley continually pioneers in control design and performance.

Let us send you a handy, condensed catalog of the Allen-Bradley line. If you are a manufacturer of motorized machines, you will find this new catalog a convenient reference manual on motor controls and related accessories.

1 **Only one moving part**

So simple—because trouble making parts have been reduced to a minimum. No pins, no pivots, no bearings, no linkages to corrode and stick.

2 **No contact maintenance**

So trouble free—because the double break, silver alloy contacts never need filing, cleaning, or dressing. Install Allen-Bradley starters—and forget them.

3 **Easy to install**

So convenient to install—because of ample wiring space, white cabinet interiors, accessible terminals, and plenty of convenient knockouts.

4 **Full line of enclosures—**

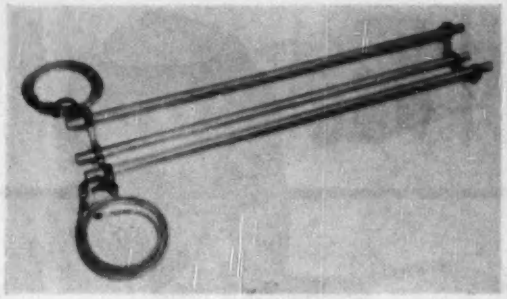
So dependable—because these switches can be supplied in exactly the types of enclosures for full protection from dust, fumes, or moisture.

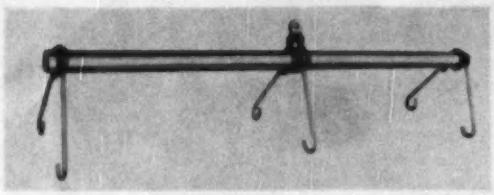
ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

A-B Quality

38M



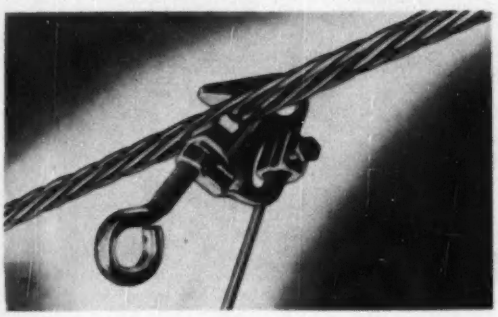


Above combination cradle; below the cradle carrier

Combination Insulator Cradle

(2) A. B. Chance Co., Centralia, Mo.

For repairing or replacing long suspension and swinging corner units hot as well as for normal use on dead-end structures, this combination insulator cradle consists of laminated wooden poles, spacer brackets, swivel tie rings and two anchoring ropes. Cradle carrier, lugs and tie ring accessories can be attached to this new basic unit to adapt it for changing out insulators on many types of structure. With a two-pole strain carrier and supporting cradle hooks it can be used for most dead-end work.



Hot-Line Clamp

(3) Reliable Electric Co., 3145 Carroll Ave., Chicago 12, Ill.

This new 408C hot-line clamp for copper and Copperweld conductors takes 4/0 strand to 6 solid line wire; 3 No. 6 to 8 solid tap. It is made of cold-forged, work-hardened copper. Eye screw, tap screw and pressure bar are of silicon bronze. The tap wire connector is a seamless copper extrusion. Can be supplied for use on steel, aluminum over steel and copper.

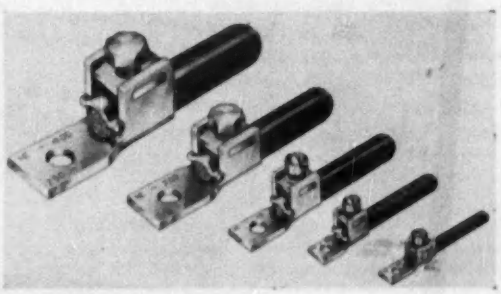
Impulse Cable Fault Locator

(4) James G. Biddle Co., 1316 Arch St., Philadelphia 7, Pa.

Designed primarily for locating faults on lead-covered cable installed in ducts, this equipment is comprised of a high-voltage d-c impulse transmitter with pickup coil and pointer indicating detector. Latest models can be used also on aeriel and buried cable and are claimed to have been effective in utility and industrial service.

In operation the set is essentially independent of the type of fault or its apparent resistance, and depends only on the impulse voltage required to break down the fault.

The model 2-2 illustrated is rated up to 20 kv. with a discharge capacitance of 2.5 muf. for use on all cable up to 15 kv. and higher. The set requires 500 watts from a 115-volt source of high-voltage d-c for proof testing on all types of electric equipment. Similar fault locating sets of higher and lower kv. and muf. ratings can be supplied and are described in bulletin 65-11.

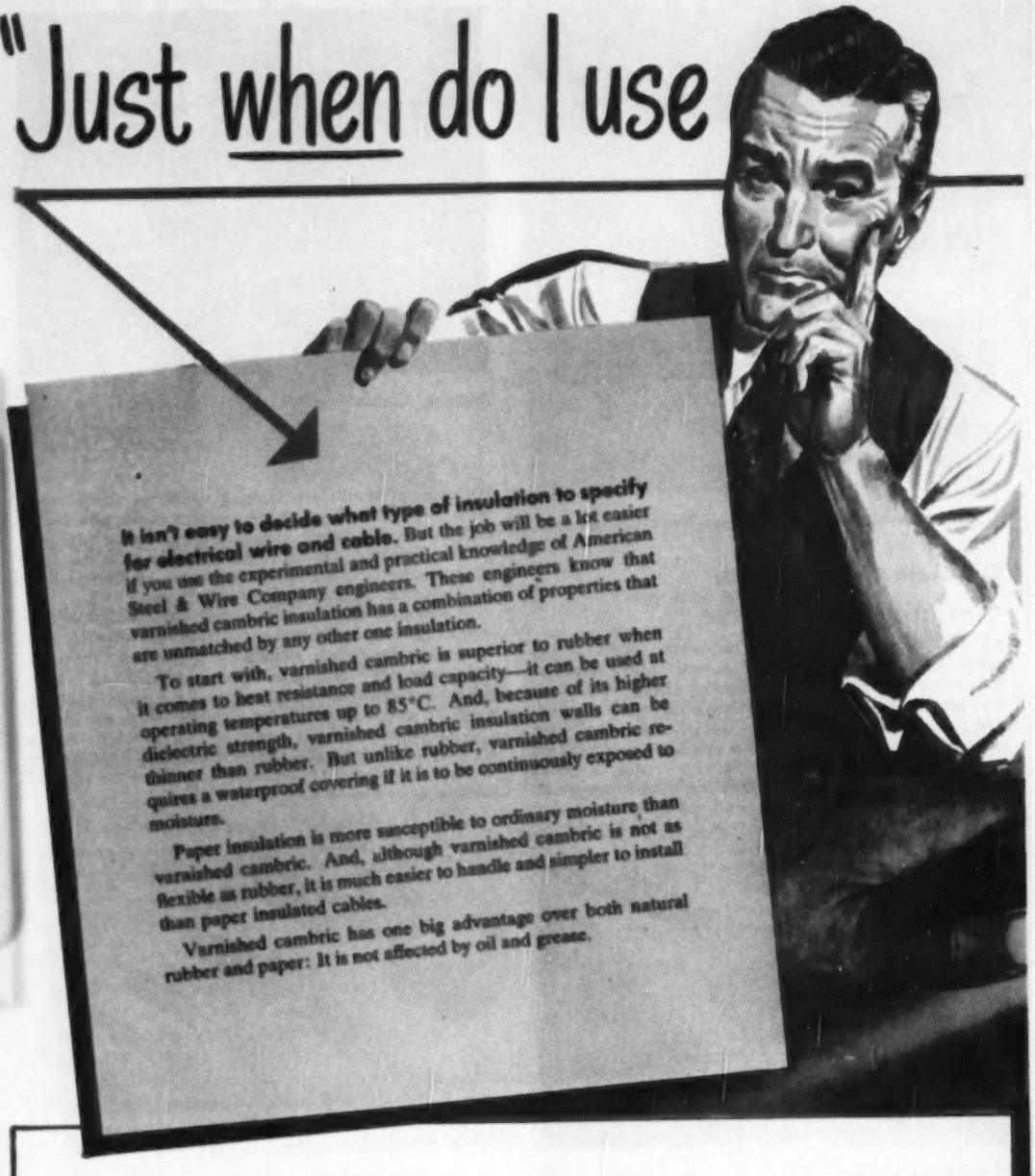


Wide Range Lug Line

(5) National Electric Products Corp., Chamber of Commerce Bldg., Pittsburgh 19, Pa.

Five lug models for use with copper, aluminum or steel wire in sizes from 14 AWG to 500 MCM comprise the new line of medium-priced pressure connectors. They are complete assemblies. Each connector is said to be capable of handling a wide range of wire and cable sizes. The three smaller sizes, NE 35, 60 and 100, can be installed with a screwdriver; the larger sizes, NE 200 and 400, require a wrench. All sizes are made with minimum overall dimensions to expedite installation in small gutters.

"Just when do I use



It isn't easy to decide what type of insulation to specify for electrical wire and cable. But the job will be a lot easier if you use the experimental and practical knowledge of American Steel & Wire Company engineers. These engineers know that varnished cambric insulation has a combination of properties that are unmatched by any other one insulation.

To start with, varnished cambric is superior to rubber when it comes to heat resistance and load capacity—it can be used at operating temperatures up to 85°C. And, because of its higher dielectric strength, varnished cambric insulation walls can be thinner than rubber. But unlike rubber, varnished cambric requires a waterproof covering if it is to be continuously exposed to moisture.

Paper insulation is more susceptible to ordinary moisture than varnished cambric. And, although varnished cambric is not as flexible as rubber, it is much easier to handle and simpler to install than paper insulated cables.

Varnished cambric has one big advantage over both natural rubber and paper: It is not affected by oil and grease.

Available Types of American Varnished Cambric Cables

CONDUCTORS:	OUTER COVERINGS:	FINISHES:	ARMOR FINISHES:	LEAD SHEATHINGS:	RUBBER SHEATHINGS:
solid stranded extra-flexible annular segmental	cotton braids asbestos braids tape	black wax firefite U.R.C. slowburning	flat steel tape interlocking metal tape steel wire basket-weave	plain jute served duck tapes reinforced rubber	where lead cannot be used

Varnished Cambric?"

APPLICATIONS

● Impregnated paper is still the standard insulation for high-voltage operation and general power transmission. And rubber is advisable for most low-voltage installations—or even higher voltages when its moisture resistance and flexibility are particularly valuable.

Varnished cambric follows the middle path, and it is often used in place of rubber or paper because of its properties.

Take a high temperature, low-voltage application. Varnished cambric is often used in place of rubber because of its higher temperature resistance, and resulting greater load capacity.

Varnished cambric is also widely used for medium-voltage (up to 5000 v) transmission lines because it is so easy to install, terminate and join. It is ideal for dry locations, and it can be used without a lead sheath because it is not subject to oil drainage.

Varnished cambric is preferred for general wiring in power stations. Typical examples are: Generator leads, insulated bus bars between oil switches, distribution transformers, etc. Oil and grease resistance of this insulation also make it useful for motor leads and transformer connections.

Perhaps the most common application of varnished cambric insulated cables and wires is for general power distribution within manufacturing plants . . . especially in heavy industries where large blocks of power are transmitted for short distances. Bridges, and other structures which require aerial cables, are often serviced with varnished cambric cables that have a rubber jacket. Rubber jackets are preferable in these locations because lead would probably be ruined by vibration.

Always remember that our engineers are willing to help you solve any wire or cable problem that you may have. And there is no obligation. Write today for Bulletin No. 6195-A "Varnished Cambric Insulated Wires and Cables."

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

American Varnished Cambric Cables

USS

UNITED STATES STEEL

"POWER PACK" YOUR MOTORS WITH OHIO MOTOR BRUSHES

We have continually stressed in our sales message to you that "The Heart of the Motor is the Carbon Brush." This is not an idle statement, but an actual fact. We here at "Ohio" have perfected an engineering service that charts your plant and makes the necessary brush recommendations for all motors at no cost to you. Avail yourself of this service merely by writing to us. The proper brush for the proper motor results in actual cash maintenance savings to you!

OHIO CARBON CO.,
12508 Berea Rd., Cleveland 11, Ohio

Gentlemen: We are interested in the following types of motor or generator brushes.

☐ INDUSTRIAL ☐ GENERAL PURPOSE ☐ MINING
☐ WELDING ☐ REFRIGERATION ☐ APPLIANCES
☐ AUTOMOTIVE and ☐ CARBON SPECIALTIES

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ORDER YOUR CARBON BRUSHES FROM A SINGLE SOURCE

West Coast Representative
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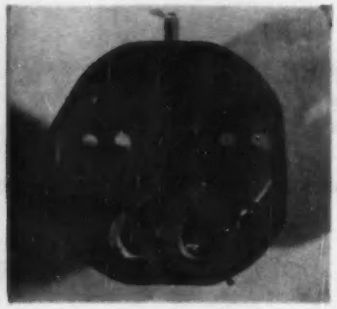
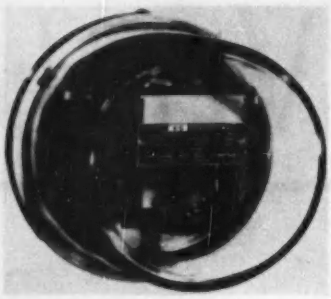
544 S. San Pedro St.
Los Angeles 13, Cal.

THE OHIO CARBON COMPANY
12508 BEREA ROAD • CLEVELAND 11, OHIO

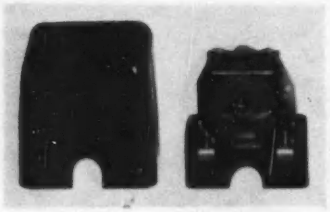




Outlet box

(6) National Electric Products Corp., Chamber of Commerce Bldg., Pittsburgh 19, Pa.

This new 3¼-in. "Redege" octagon outlet box (catalog 2963) has two all-purpose clamps to take armored cable, non-metallic sheathed cable and flexible tubing in connection with open-type wiring. The new box is 1½ in. deep, is made of 14-gage formed steel electro-galvanized and is Underwriters' approved. It replaces ten previously listed boxes.



Accelerating Relay

(7) General Electric Co., Schenectady 5, N.Y.

This voltage-type accelerating relay was designed specifically for starting single-phase, capacitor-start and capacitor-start capacitor-run motors. It is said to be particularly applicable where adverse atmospheric conditions exist or where it is desired to have remote control that can be incorporated into an explosion-proof case. It will have most use in control of hermetically sealed refrigerator compressor motors. It comes with or without cover, can be wired from top or bottom and all parts are corrosion resistant. Calibrated at the factory to pick up at a predetermined voltage, change in calibration after more than 500,000 operations is said to be less than 2%. The voltage principle is said to eliminate voltage drop at motor terminals; wide differential between pickup and drop-out voltage gives positive operation of the control despite wide variations in line voltage. Contact rating is 50 amp. at 115 volts and 30 amp. at 230 volts.

Load Control Device

(8) Sangamo Electric Co., Springfield, Ill.

The Controlomax, a new device for reducing peak load demands, is claimed to have advantages of simplification and low cost.

The device is a simple, thermally operated switch that automatically opens a controlled circuit supplying a deferable load whenever the current in the controlling circuit exceeds a predetermined value. It may be connected into the main service, in which case the total load is the controlling factor in operating the switch, or it may be connected into a branch circuit, if the value of the branch load is to be the controlling factor.

The heating effect of the main load current passing through the device causes a bimetallic assembly to bend sufficiently, according to the predetermined calibration, to actuate a Microswitch connected in series with the deferable load. The Controlomax is rated at 60 amp. An adjustable setting provides for disconnecting the branch circuit on main circuit loads ranging from 20 to 30 amp.

According to the manufacturer, under normal conditions, the device should require practically no maintenance, since it has no rotating parts. It is available in two types: Type AS with base and cover similar to the conventional socket-type meter for either indoor or outdoor installation; type AB, which is mounted in a rust-resistant rectangular metal enclosure.

Chemical Motors

(9) Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

New type CSP Life-Line motors are designed especially for applications where corrosive fumes and liquids are present. Frames, brackets, hoods and other exposed parts are alkali-cleaned, hot-water rinsed, then rinsed in chromic acid spray. After drying they are sprayed with phenolic-alkyd-type enamel and baked. Factory sealed prelubricated bearings are used.

Cables run COOLER...
in TRANSITE DUCTS

. . . reducing copper losses

. . . increasing current capacity

. . . prolonging insulation life

HERE'S HOW to reduce copper losses . . . increase current carrying capacity . . . and prolong insulation life—run your cables in Transite* Ducts.

Current carrying capacities can be increased in a typical duct bank as much as 5%, or I^2R losses can be reduced 11%, for cables located in Transite as compared with other ducts used for power circuits.

And, Transite Ducts assure permanent duct banks because Transite is incombustible; is immune to rust and rot; is unaffected by electrolysis; will not slag under action of an arc, and will retain its high original strength.

An unusually smooth bore assures no injury to cable sheath, either in natural movement under load, or when pulling-in cables. Long, lightweight lengths can be quickly and economically installed. In addition, a full line of fittings simplifies even the most complicated of installations.

For full information on Transite Ducts, write for Data Book DS-410. Johns-Manville, Box 290, New York 16, N. Y.

*Reg. U. S. Pat. Off.

How Transite Ducts increase current carrying capacities

Type cable 3 cdr. 500 MCM Compack Sector, 15 KV (6th Edition AEIC Spec.)
No. of cables—3 (all loaded in one bank)
Daily Load Factor—75%
Earth Temp. ambient—20 C

	Transite	Other
Total Therm. Res. to Dielectric Loss (C watts/ft.)	5.66	6.17
Total Therm. Res. to Copper Loss (C watts/ft.)	4.44	4.95
Temp. Rise from Dielectric Loss (C)	1.9	2.1
Allowable Rise for Copper Loss (C)	59.1	58.9
Allowable Watts per ft. cable	4.44	3.96
Allowable Current—(Amps. per cdr.)	386.	365.
Allowable Current—(Relative %)	105.6	100.

Johns-Manville *Transite Ducts* **"KORDUCT"— for encasement in concrete**

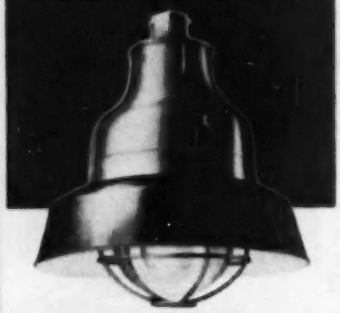
"CONDUIT"— for use exposed and underground without encasement

Rely on Quality—

PYLE-NATIONAL INDUSTRIAL LIGHTING FIXTURES

for safety

IN HAZARDOUS LOCATIONS



EXPLOSION PROOF

Pyle-National LL Series: Class I, C and D

For use in locations where highly flammable materials are manufactured or handled.

Rugged, flame-tight cast aluminum alloy housings render internal explosions harmless, and insure safe operating temperatures. Threaded construction permits easy access to interior for wiring and lamp replacement. Available in many types and sizes.

DUST-TIGHT

Pyle-National DL Series: Class II, Groups, E, F and G

For use in locations where flammable dusts are present in quantity.

Strong, one-piece cast aluminum alloy housings are designed to exclude dust from the interior and to avoid accumulation of dust on the exterior surface. Available in many types and sizes.

Consult the new PYLET Catalog for complete line of explosion-proof supporting PYLETS for lighting fixture mounting.

THE PYLE-NATIONAL COMPANY

1344 N. KOSTNER AVENUE CHICAGO 51, ILLINOIS

Pacific Coast Sales Office

25 Beale Street, San Francisco 6, Calif.

Multibreaker

(10) Square D Co., 6060 Rivard St., Detroit 11, Mich.

A new 2-pole "Ad-On" multibreaker extends circuit arrangements on type MO 8 "Ad-On" load centers. The type MO 8 can now be extended to include up to a maximum of three double poles in combination with various single pole "Ad-On" circuits for lighting loads. The new MO2A is a thermal magnetic, common trip breaker having only one operating handle. It is claimed to offer a quick, convenient means of adding a water heater, clothes dryer, dishwasher or other 220-volt load.

(11) HIGH FREQUENCY INSULATION —Teflon is being manufactured in forms of rod and tubing by Polymer Corp., Reading, Pa.

(12) MOTOR —The "Klosd-Tite fan-cooled motor is now available with face-mounted end bracket having NEMA style C dimensions in ratings from ¾ to 20 hp. Sterling Electric Motors Inc., 5401 Anaheim-Telegraph Road, Los Angeles 22, Calif.

(13) SHUNT CONNECTION — Statite, claimed to be a permanent shunt connection for carbon brushes, is being manufactured by the United States Graphite Co., Saginaw, Mich.

(14) DRIVE —A full-wave reversing educational "Thy-mo-trol" drive designed to assist in teaching electronic motor control and associated circuits has been announced by the Educational Section of General Electric's Apparatus Department, Schenectady 5, N. Y. This demonstration equipment consists of seven circuit panels and five instrument panels assembled on a steel frame, mounted vertically on a steel table with a composition top.

(15) COLUMN LIGHT —A weatherproof model for outdoor use has been announced by Stone Mfg. Co., Elizabeth, N. J. It is said to give uniformly high lighting intensities over a wide ground area; has a heavy steel porcelain-enamel reflector, 20½ in. in diameter, with an overhanging skirt to minimize glare.

STEEL STRAND

Crapo

ALL the strength and durability inherent in steel are combined—with definite economies—in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.

MUNCIE INDIANA

Get

MULTIFLEX BRUSHES

for

- **IMPROVED COMMUTATION**
- **MORE UNIFORM WEAR**
- **LOWER OPERATING COSTS**

U. S. Pat. 2,181,076

Yes, Helwig-Speer Multiflex Brushes give you the "big three" of motor and generator performance. The best in design and materials means: (1) uninterrupted contact, (2) reduced vibration, (3) reduced circulation current, even wear. What's more, you get double-brush advantages with single-brush simplicity. Multiflex fits conventional single-brush holders. For complete information on ordering brushes, write for Catalog 95.

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Salt Lake City ..... 524 E. 4th.; Tel: 3-1600

HELWIG SPEER

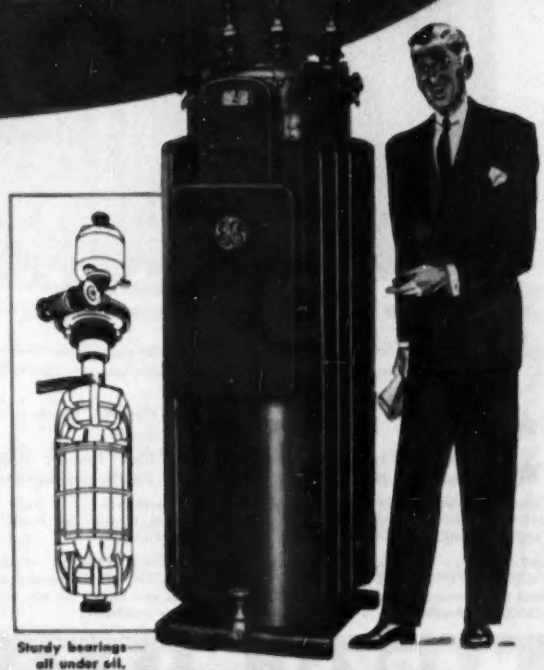
HELWIG CO., Carbon Products

Makers of Multiflex and Trimsert Brushes

Requires Less Maintenance

than any other regulator you can buy...

GENERAL ELECTRIC IRS INDUCTION VOLTAGE REGULATOR



Sturdy bearings—all under oil.

★ **No contacts in the main circuit.**

★ **No cams or springs or elaborate gear trains.**

★ **No mechanical brake to adjust, no separate braking circuit.**

★ **Even the oil lasts longer—because the tank is sealed to stop all breathing.**

General Electric IRS induction voltage regulators give accurate, stepless regulation—with no time-delay. They respond immediately and will correct the voltage at an average rate of 1 per cent in 1½ seconds throughout the entire range of ±10% regulation.

And—no other regulator can match them in low maintenance costs. Ask for Bulletin GEA-2985.

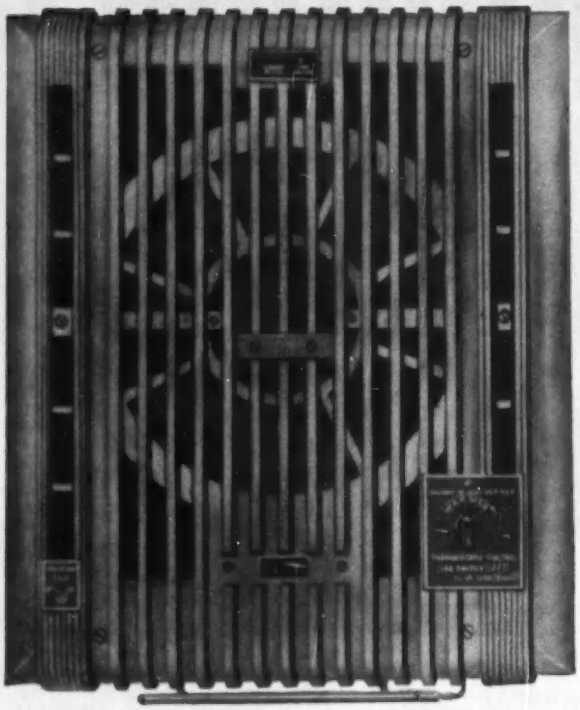
Apparatus Dept., General Electric Company, Schenectady 5, New York.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

HEETAIRES

give you EVERYTHING your CUSTOMERS want



SERIES 700 HEETAIRES . . . 1500 to 3000 WATTS WITH OR WITHOUT BUILT-IN THERMOSTATS

Tested & Listed Under Reexamination Service by Underwriters Laboratories, Inc.

★ 1000 to 6000 Watts

★ Radiant, Black and Fan-Forced Heat

★ Built-in or External Automatic Thermostatic Heat Controls

★ Wall-Inserts, Wall-Surface Attachables and Portables

There's a HEETAIRE for every purse and purpose . . . and when you sell HEETAIRES, you sell the right electrical space heater for both! And that means more sales and more profits for you!

***DEALERS:** Write us for your free "GUIDE TO QUICK HEATING" . . . and the name of your nearest HEETAIRE wholesaler.*

***WHOLESALERS:** Write us for the HEETAIRE sales-and-profit story — and the name of our representative in your territory.*

MARKEL
ELECTRIC PRODUCTS, INC.
148 SENECA ST.

LA SALLE
LIGHTING PRODUCTS, INC.
BUFFALO 3, N.Y.

(16) SERVICE EQUIPMENT—New 100-amp. outdoor service equipment is said to permit increased capacity while giving dependable protection by the magnetic principle of operation. Heinemann Electric Co., Trenton, N. J.

(17) SWITCHES—Type AW switches of Hi-Voltage Equipment Co., 4000 E 116th St., Cleveland 5, Ohio, are now available with a "silver bridge" at the hinge. This new connector takes the place of the conventional flexible shunt. It excludes the second set of make-and-break contacts that have been used on switches eliminating flexible shunts. The bridge consists of one or more pairs of copper bars welded to silver-nickel accurately finished for contact with silver bands at the hinge centers. Flexible-shunt models also are available.

(18) METER COVER—A new socket cover for all standard S type meters has been announced by the F. D. Kees Mfg. Co., Beatrice, Neb. Designed to prevent glass breakage, it can be mounted to the meter base with thumb screws or standard bolts. Outside diameter is 8 in.; depth is 5⅝ in.

(19) BALLAST — "Trigger-Start" ballasts for instant starting of residential fluorescent lighting have been announced by General Electric Co., Specialty Transformer and Ballast divisions, Schenectady 5, N. Y. They are for the standard 20-watt F lamps and the standard 32-watt circline F lamps.

(20) ADAPTER—The Heyco strain relief bushing adapter is a steel plate that fits into standard knock-out-box holes. It is designed to replace connectors and other fittings. Heyman Mfg. Co., 100 Michigan Ave., Kenilworth, N. J.

(21) ANCHOR—A 4-way expanding earth anchor is said to incorporate all the features of the manufacturers older 2-way anchor. It has four blades fabricated from two pieces of heavy sheet metal, expanded by exerting tamping force directly onto the sharp edged blades. Comes in 6,000-, 8,000-, 10,000- and 12,000-lb. sizes. Pieper-Lillard, Inc., St. Louis 22, Mo.

(22) TIMER—An audible signal timer, designed for photographic work, has been developed by General Electric Co., Meter & Instrument Division, Schnectady 5, N. Y. Designated as type T-68, it has a range of 0 to 40 minutes; signals with an electric buzzer.

(23) STARTER—Sentry TC type F starters have an air-thermal design; a cut-out feature to protect ballast. Industrial Starter Corp., 6 Pell St., New York 13.

(24) FLOODLIGHTS—A line of house and garden commercial floodlights has been announced by the Moldcast Products Inc., 68 Clifford St., Newark, N.J.

(25) LAMPS—Three new lamps for use in photochemical processes are available from Westinghouse Lamp Division, Bloomfield, N. J. They are designed to emit a maximum of energy in the commonly utilized wave lengths near 3,650 Angstrom units.

(26) F FIXTURE—An 8-ft. 2-lamp fluorescent lighting fixture, and a 4-ft. matching unit have been announced by Sylvania Electric Products Inc., 500 Fifth Ave., New York. The 8-ft. HFFS-296 is for continuous-row mounting; uses two 4-ft. reflectors; two 75-watt T-12 slimline lamps.

ELECTRICAL WEST

Reader Service

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Manufacturers' publications are a quick, efficient way for you to keep posted on developments in the electrical field. American industry is offering a valuable service—free. Electrical West makes it easy for you to secure this service. Check and mail the postcard at the bottom of this page. That's all you have to do to get bulletins and additional information on new products mentioned in this issue. Fill in the squares on bottom card to secure more information on products or services advertised in this issue.

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For additional information on other departments in the magazine, use the card at right. If you want to ask a question on a technical subject, get a "gripe" off your chest or make a suggestion to the editors, fill in the card; mail it to Electrical West.

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San Francisco 4, California

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Please send me, without obligation, the new product information or catalogs described on the following pages and identified by numbers circled below:

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ELECTRICAL WEST

Reader Service

The editors of Electrical West will be glad to answer questions on engineering techniques; in the lighting and wiring fields; on the electrical code; on merchandising and appliance markets and other phases of the electrical industry in the eleven Western states

Dear Editor:

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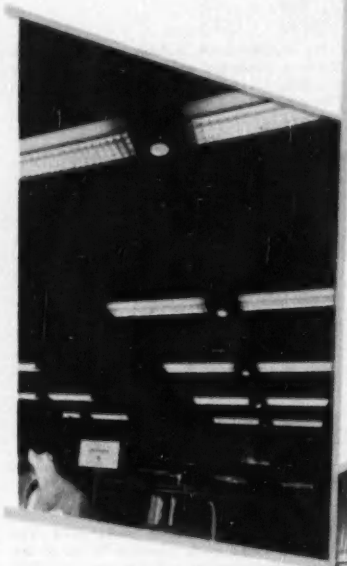

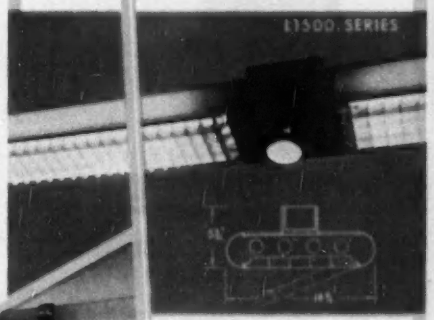

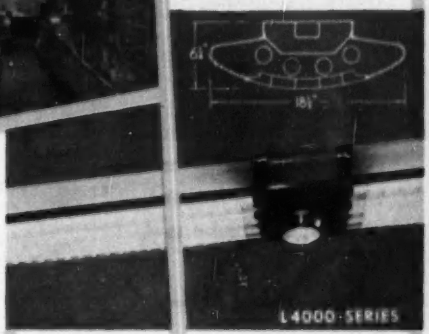

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BULLETINS ETC.

(27) UTILITY TRANSFORMER—Bulletin 250 from Sorgel Electric Co., 838 W. National Ave., Milwaukee 4, Wis., describes a unit that can be used as a pipe thawer or for heavy-duty soldering and brazing.

(28) STAPLER—An automatic electric stapling machine is described in a new bulletin from Staplex Co., 68-72 Jay St., Brooklyn 1, N. Y.

(29) TRANSFORMER—The ACP distribution transformer, completely self-protected, is described in an 8-page publication from Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis. Mechanical data and the five type designations of the transformer are given, along with a typical load-time curve for one of the units. These transformers are available in ratings of 3-100 kva., 2,400-14,400 volts.

(30) CATALOG—A listing of new and rebuilt electrical equipment is contained in a catalog from the Duquesne Electric & Mfg. Co., Broad St. and Hamilton Ave., Pittsburgh 6, Pa.

(31) FANS—Its complete line of electric air circulators is included in catalog X6558 issued by Emerson Electric Mfg. Co., St. Louis 21, Missouri.

(32) RECORDER—A new bulletin on its pneumatic Capacilog, air-operated strip chart recorder, has been released by Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.

(33) CIRCUIT PROTECTION — A bulletin based on the latest proposal for circuits of 30 amp. and less by the EEI-AEIC joint committee on branch circuit protection has been published by the Chase-Shawmut Co., 367 Merrimac St., Newburyport, Mass.

(34) ANNUNCIATORS—Locking push button and related equipment used in nurses' call stations is described and illustrated in a folder HLS-2 from Cannon Electric Development Co., 3209 Humboldt St., Los Angeles 31, Calif.

(35) REMOTE CONTROL WIRING—A new booklet gives advantages of this low-voltage system of lighting control for home, farm and industry. Circuit diagrams are included. General Electric Co., Construction Materials Department, Bridgeport 2, Conn.

(36) CODE SIGNAL RELAY—Revised bulletin FA-2 on the company's fire alarm stations is offered by Cannon Electric Development Co., 3209 Humboldt St., Los Angeles 31, Calif.

(37) PLASTICS—A bulletin on Dilecto and Celoron, laminated and molded thermosetting plastics, has been prepared by Continental Diamond Fibre Co., Newark 14, Del.

(38) GEAR-MOTORS—Bulletin 3-100 on various types of standard fractional and integral gear-motors has been published by Janette Mfg. Co., 556 W. Monroe St., Chicago 6, Ill.

(39) EXPLOSION-PROOF MOTORS—Units from ¾ to 125 hp. are covered in a 2-page bulletin from Reliance Electric & Engineering Co., 1111 Ivanhoe Road, Cleveland 10, Ohio.

(40) BREAKERS—Federal Noark QL Panelettes are described and illustrated in literature from Federal Electric Products Co., 50 Paris St., Newark 5, N. J.

(41) PRECIPITATION — A 16-page, 2-color booklet on electrostatic precipitation is offered by General Electric Co., Schenectady 5, N. Y.

(42) WIRING GUIDE—A pocket-sized catalog and wiring guide covering its line of surface metal raceways and fittings is available from the Wiremold Co., Hartford 10, Conn. It is designated No. 18.

(43) WELDERS—Information on 200-, 300-, and 400-amp., 60% duty cycle, selenium rectifier d-c welders is included in booklet DB 26-100 from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

(44) RELAY—Type 5 Carpenter polarized relay and two larger relays are described in bulletins 110-111-112 available from C. P. Clare & Co., 4719 W. Sunnyside Ave., Chicago 30, Ill. Clare is distributor of the Carpenter relays in the United States.

(45) MOTOR SELECTION—A 4-page booklet on selection of small motors is available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

Fill in the postcards on page 43

To get more information on new products and to order catalogs or bulletins mentioned in this section, fill in and mail the bottom postcard on page 43. Electrical West Reader Service is being expanded to include information on any department in the magazine. Use the second card on page 43 to ask questions or make suggestions.

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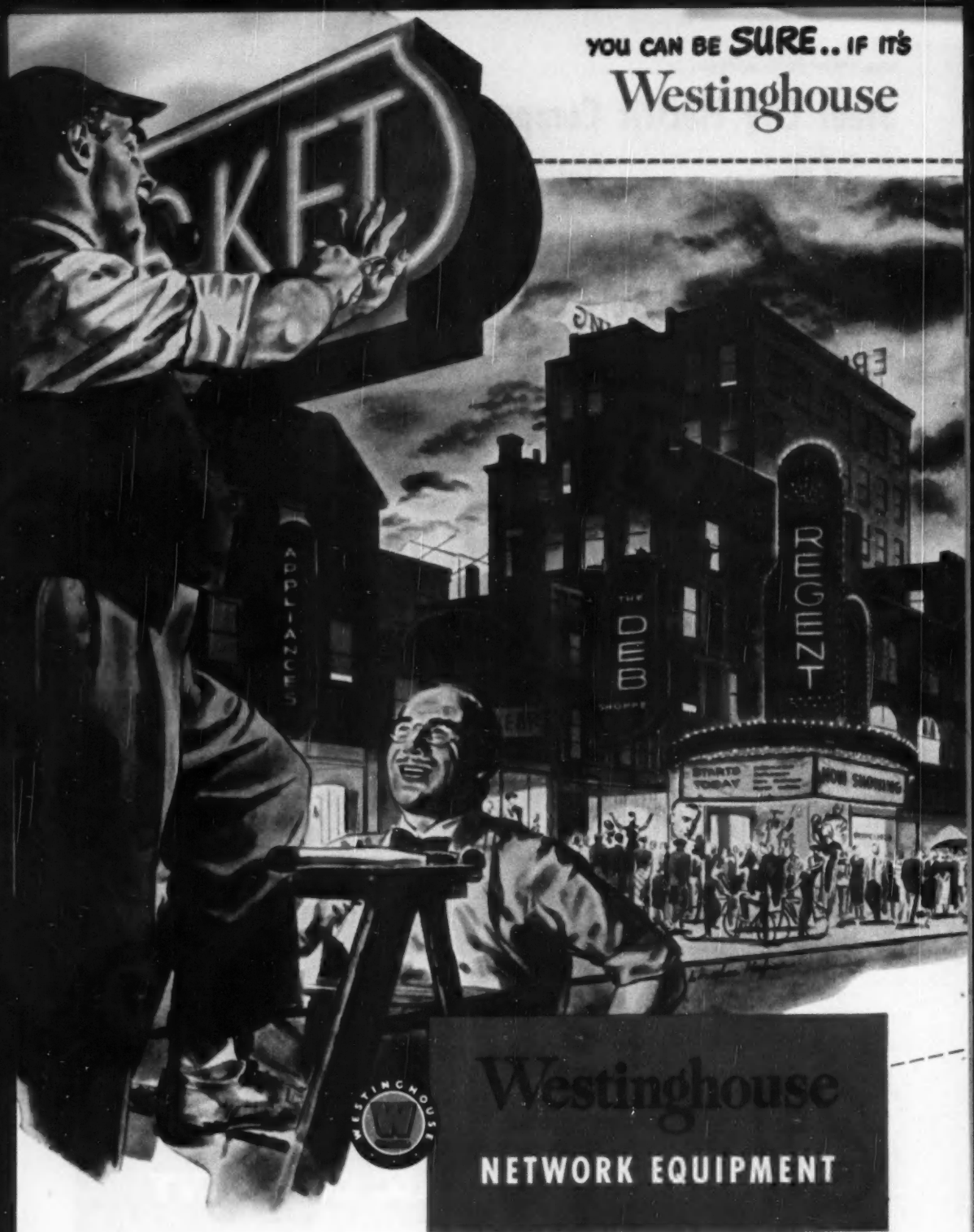
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Twenty-one percent of all cities in the 25,000 to 100,000 population range enjoy the advantages of a secondary network system! And their number will grow, because . . .

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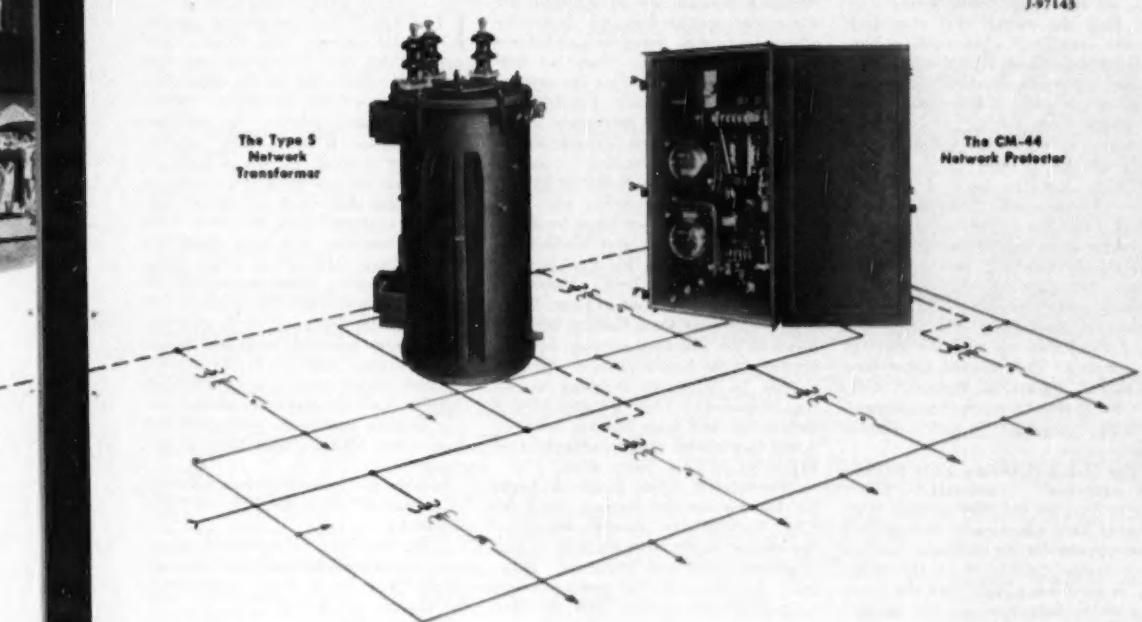

ELECTRA'S HUSBAND

"TOO many people take electric service for granted," I told Electra one Saturday morning last month as I was trying to fix the light switch on the kitchen wall.

"And you're one of them," she commented acidly. "For a so-called electrical engineer, you know less and care less about the electrical things in this house than your four-year-old nephew. An appliance has to break down completely before you even notice. Why you won't even change a burned-out light globe."

"Now, now, don't let your blood pressure go up," I said. "I'm fixing this switch for you. And I just ordered some R-30 globes to go in the dining room fixture. Wait until you see how they light up that room—indirect lighting too from that antique candelabra fixture."

"All right, go on with your story," she said. "What prompted your remark about people taking electricity for granted?"

"Well, most folks get so accustomed to having the lights go on, or the iron heat, or the range cook every time they flick the switch that they kick like the very devil when nothing happens. If there should be a momentary service interruption, they don't ever think of the cause. They just blame the power company."

"And why not?" she asked. "Who else could be at fault?"

"That's just the point I want to make," I continued. "Last week over at Salt Lake the power company people told a story that demonstrates how such things occur. It seems that Assistant Secretary of the Navy Dan Kimball and a party of Navy brass arrived at their hotel one night and found the lights out and the elevator not running. They beefed about having to walk up several flights of stairs with flashlights to reach their rooms."

"Well, wouldn't you?" Electra asked.

"Not if I had known what actually had happened," I answered. "They didn't. You see the pilot of their four-motored Navy plane came into the Salt Lake airport for an ordinary landing along about one o'clock in the morning. A good ways back from the boundary of the field there are two double-circuit power lines that serve the city. They are steel tower lines and each one has a light static wire running along the top of the towers to provide lightning protection. It's five or six feet above the top 44,000-volt conductor of each circuit. Well that pilot leveled off just sixty feet above the ground and clipped the static wire as nicely as you please."

"Was that bad?" she asked innocently.

"Bad! You haven't heard the half of it," I continued. "There is another power line, an almost exact duplicate of the first, a hundred feet closer to the field. Darned if he didn't fly his plane over it without ascending or descending a foot. So he clipped the static wire on that line too. Naturally when the broken wires dropped down into the high-tension lines all hell broke loose somewhere on the system. Both lines kicked out immediately. But the pilot and his passengers didn't know a thing about it. He headed on into the field and because he apparently didn't like the looks of things, he pulled up and circled the field and came in again for what he called a 'normal' approach and landing.

"Probably it was his first landing on the Salt Lake field. There's a funny thing about that airport. When a pilot comes in for a landing and sets down on the principal runway, he's liable to get the heebie-jeebies. All of a sudden he thinks he is going to run out of runway. Then he goes over a little hump and finds another 3,500 or 4,000 feet ahead of him. Maybe that happened to this Navy pilot.

"Fortunately Utah Power & Light Co. has another line feeding Salt Lake City. So when the plane landed all of the airport lights were lit and no one suspected what had happened. However, by the time the party arrived up town twenty minutes later, this line had become so overloaded that it kicked out too and the whole city was in darkness. So they complained because there was no electricity."

"Didn't they know what a close shave they had had?" she inquired.

"Not until the next day," I said. "The power company line crews located the trouble quickly. When they saw that the static wires had been cut and had fallen into the line, they knew a plane must have done it. So they checked to see what plane landed at about the time the lines failed. The Navy plane obviously was the transgressor. When they looked at the ship, they found that it was still trailing some of the static wire in its tricycle landing gear. Careful measurement showed that the tire on the landing gear might even have skimmed the 44,000-volt wires. It was that close."

"A narrow squeak, wasn't it?" Electra commented.

"You said a mouthful, my dear. They won't ever come that close again and live to tell about it. But then as I said in the beginning, a lot of folks take electricity for granted."

IT WASN'T the new electric ranges or the gadgets that Edison had invented that crowds lingered over, but life itself. Each day as 30 eggs were hatched in a glass incubator, that's where people gathered during the Orange Show at the Edison exhibit. And they stayed, for it is quite a while from the first peck of a tiny beak through the shell until the bewildered, wet, and cramped chick gets used to its new environment and can stand up, dry out and walk about. The event is one few urban dwellers ever see, although farmers know it very well. It is part of the drama of birth and life. People sense a kinship with this drama and seem fascinated by it. To be sure the new ranges nearby abounded with gadgets, new mechanisms almost human in their operation, perhaps better than most human operators in accuracy.

A farm girl herself, Electra wasn't a bit surprised when she was told this observation.

"You men get so conceited about your machines and gadgets," she replied. "You forget which comes first, the chicken or the egg."

Come to think about it, which one of them does?

A GROUNDED 200 hp motor recently put a large press out of commission for a midwest steel-tank firm. Dietz Electric, A-C Certified Service Shop, picked up the motor Saturday a.m. The stator was rewound and the motor back on the press in 36 hours — with no lost production time!

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Oakland—T. L. Rosenberg Company
San Francisco—Weidenthal-Gosliner
San Jose—Rosendin Elec. Works

COLORADO
Denver—Baker Electric Company

CONNECTICUT
Hartford—Charles H. Leppert
Waterbury—Elec. Motor Repair Co.

FLORIDA
Jacksonville—Turner Elec. Works
Miami—Peninsular Armature Wks.
Tampa—Tampa Armature Works

GEORGIA
Atlanta—Bearden-Thompson Elec. Co.
Columbus—Smith-Gray Electric Co.

ILLINOIS
Chicago—Chicago Electric Company
Marion—Giles Armature & Elec. Wks.

INDIANA
Indianapolis—Schurer Electric Co.
Evansville—Evansville Elec. & Mfg. Co.

IOWA
Sioux City—Smith Elec. & Supply Co.

KANSAS
Wichita—Tarrant Elec. Machinery Co.

LOUISIANA
New Orleans—Industrial Electric
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MAINE
Brewer—Stanley J. Lewis Company

MARYLAND
Baltimore—Keystone Elec. Co., Inc.

MASSACHUSETTS
Cochard—A. E. Tracy
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MISSOURI
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NEBRASKA
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NEW JERSEY
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Cuyahoga Falls—A-C Supply Company
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Oklahoma City—Southwest Elec. Co.
Tulsa—Smith-Milligan Electric Co.

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Eugene—Kalon Elec. & Mach. Co.
Klamath Falls—Ray Bigger Elec.
Portland—Milwaukee Machinery Co.

PENNSYLVANIA
Johnstown—Universal Elec. Mfg. Co.
Oneota Mills—Mid-State Elec. Equip.
Philadelphia—Elec. App. Repair Co.
Pittsburgh—Penn. Elec. Coil Corp.
York—Industrial Electric Company

RHODE ISLAND
Woonsocket—Dunlay & Burdsley, Inc.

SOUTH DAKOTA
Sioux Falls—Elec. Motor Repair

TENNESSEE
LaFollette—Standard Armature Wks.
Memphis—Ind. Elec. & Supply Co.

TEXAS
Amarillo—G. E. Jones Electric Co.
Dallas—Industrial Elec. Equip. Co.
El Paso—R & M Machinery Company
Ft. Worth—Control Electric Company
Houston—Ray A. Barnett Company

VIRGINIA
Richmond—Wingfield & Hundley
Roanoke—Virginia Armature Company

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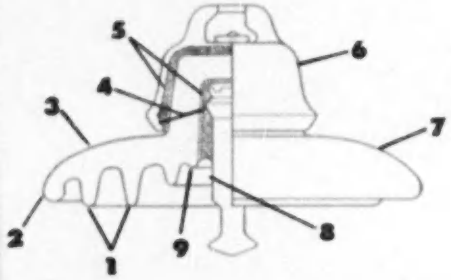

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3. Compression Glaze—a Locke development—assures high resistance to damage from thermal shock or mechanical impact. This means that Locke insulators can be handled faster in construction without danger of chipping or breaking.

4. The insulator arch is formed between the cap edge surface as the abutment and the stepped pin as the keystone. Thus while loaded in tension, the porcelain itself is working in compression and the best characteristics of all materials are utilized.

5. Locke Compression Sand at the cement joints adds to the strength, and the stability of that strength, throughout the life of the insulator.

6. Galvanizing is done by the exclusive Locke Permazinc process—a quality-controlled, double hot-dip method that assures the highest degree of resistance to weathering and corrosion.

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8. The large diameter of the pin extends beyond the cement line. This assures cement joints of minimum radial thickness, freedom from troubles arising from thick cement joints, and reduces leakage current concentration (with its resulting corrosion hazard) at this point.

9. This small barrier (petticoat) adjacent to the pin reduces leakage streamers and adds to pin life.

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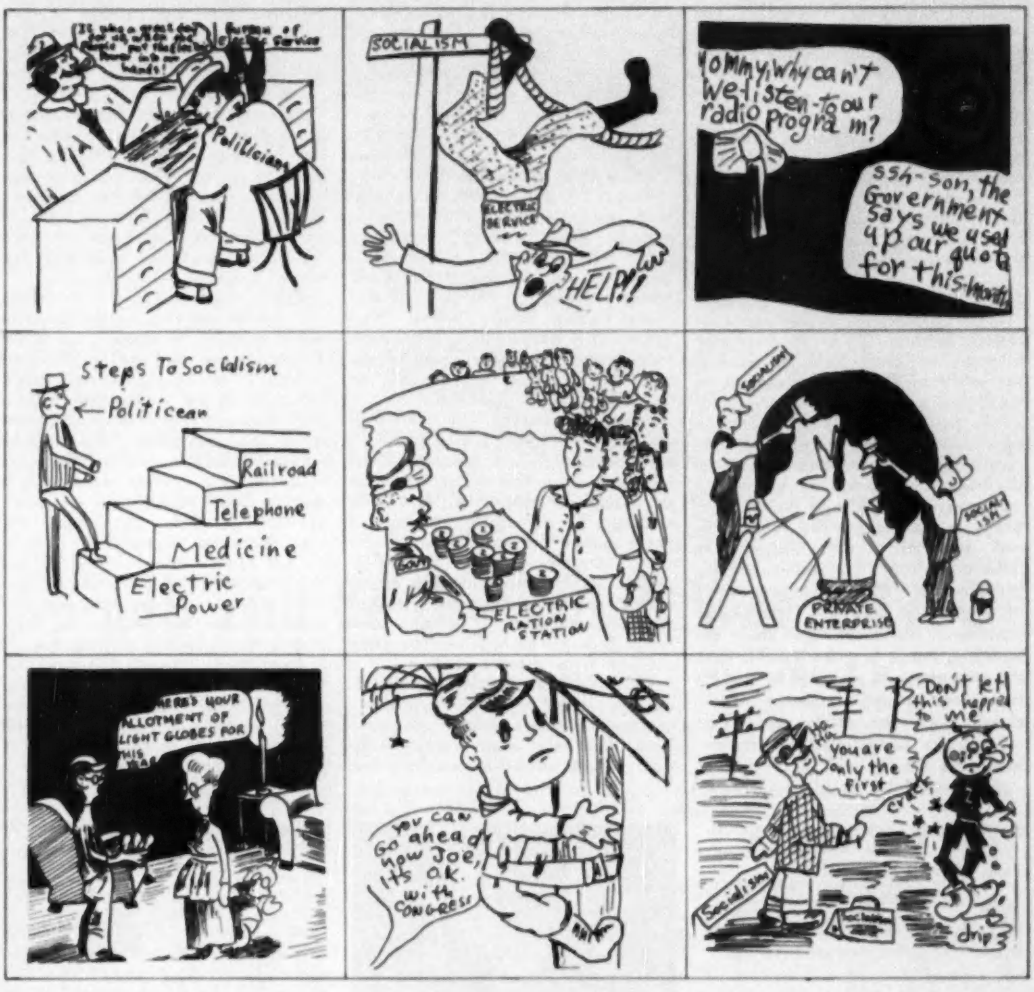


What People Think About Socialism

WHAT is socialism, anyway? Does the public really know? If it did, what would it do about it?

To define socialism, one courageous company has stepped over the barbwires and entered a public relations area regarded by many business firms as taboo. The Washington Water Power Co., Spokane, attempts to hold up ingredients that go into the socialist pudding, so that the public will know what it is eating.

In the first place, the public does not want socialism. Surveys and elections prove the fact beyond doubt. Yet the public is adopting socialism piecemeal, and this largely because so many people are reluctant to come into the open and explain what is happening.

In other words, the same consumers who have voted against a suspected poison called socialism, continue to

imbibe small doses of arsenicism and strychninism every time they place segments of our economy into the hands of government. That is inconsistency with a gusto. It is like denouncing sin, yet showing enthusiasm for shoplifting, drunkenness and gambling. Thus, to encourage greater consistency between conduct of the voter and his attitude, the perpetual problem of defining both socialism and sin remains to be solved.

The Water Power company attempts this defining process with a series of drawing contests. Through the medium of advertising, each contest defines some phase of socialism. For example, in one contest the public is reminded that "if government takes over the medical profession, that would be a step toward socialism." A second contest ad, run the following month, carried the heading, "If the government takes over the electric industry that would be a step toward socialism." Each ad invited the public to illustrate the caption in the blank space that was provided.

The first advertisement relating to socialization of the medical profession brought in more than a thousand illustrations — nearly all youngsters and many adults like to draw. Practically as many responded to the second ad dealing with the electric industry which, for some reason, brought in a much greater proportion of outstanding drawings. Perhaps the contestants found the topic more interesting, but it is quite possible that the response is a measure of the effectiveness of the continuous educational work the utility has done through its institutional advertising. Male and female, with ages varying from three to seventy-three, drew fascinating concepts of socialism, or they scribbled with the most amazing irrelevancy. Some drawings were bitter against socialism, others were sinister, others humorous. Only one illustration in the first thousand suggested some subtle meaning directed at the group that opposed socializing the medical industry. The thought, however, was too subtle for certainty. Many of the drawings sent to the second contest carried graphic messages that approach the quality of the work of our best political cartoonists. Naturally, the artistic content fell somewhat below that of Darling, Low and Carlisle.

Judges in the contest, well-known local artists, selected a dozen prize winners. These winners, apart from public recognition at a time when their skills are later reproduced in the newspaper, received only a small momento for the effort involved. Non-winners and winners alike were, however, promptly mailed a card of appreciation, together with a miniature metal likeness of Reddy Kilowatt.

After the contest, the thousand drawings were pasted in a portfolio and presented before the medical association. Projection slides made the more amusing entries visible to the audience. The explanatory talk pointed out a mutual problem facing all private enterprise groups. The effort proved highly stimulating and appreciated. A companion presentation, featuring the electric industry cartoons, is in use to approach the same problem from another angle.

One item that deserves mention is the open letter to parents which accompanies each contest announcement. This letter states unequivocally that: "These advertisements have but one aim—to point out that government taking over of first one and then another profession, industry and business leads inevitably to socialism . . . No matter how government ownership may be described by disguised socialist planners, government control will lead to socialism . . . " The ad also carries a coupon signed by adult participants, or by the parent of youthful artists, giving the company the right to reproduce submitted materials in ads.

Subjects that invite future contests are endless. For example, the sponsor, the Washington Water Power Co., plans to include such topics as mining, labor unions, housing, transportation, lumbering, farming, etc. If government takes over any business, whole or in part, that is another step toward socialism.

The contest idea applied to socialism was dreamed up by the advertising department of Washington Water Power. It not only proves that one picture is worth a thousand words, but it hints that a thousand pictures will multiply constructive attitudes many fold. The contest idea could be unusually effective on a national scale. If worth-while rewards are offered, it may be found that literally thousands of cartoons, clever or vicious, will take the trend to socialism brutally to task. If local experience is reflected in a national program, should one develop, very few poisoned-pen pictures will denounce the sponsor. Dripping in good humor, showing fear of a government growing too powerful, or mere scribbling from the hands of a child—in all this, one thing is certain; participants who draw will probably think more favorably of private enterprise, not against it.

1. Utility invited public to illustrate the caption, "if the government takes over the medical profession that would be a step toward socialism"

2. More than a thousand entries were received from adults and children; were sent to the judges, well known artists, who selected 12 prize winners

3. Winners were announced and best cartoons were reproduced in an advertisement that also told the public to watch for next month's contest

Measuring off snow course prior to taking samples. Photos by Soil Conservation Service

South Will Be Dry, North Wet in 1950

R. A. Work
Senior Irrigation Engineer

Paul A. Ewing
Senior Irrigation Economist
U. S. Soil Conservation Service

Clyde E. Houston
Irrigation Engineer

A CLOSE repetition of the 1949 water-supply performance in the eleven Western States is promised by analyses of April snow surveys by the Soil Conservation Service.* The forecast is: plenty of water — maybe more than plenty—in the Northwest; enough in the Intermountain States; not enough for comfort in the Rio Grande Valley and Arizona. The forecast is subject to change, of course, and April storms in several sections—notably the Cascades and Sierra—may result in run-off substantially better than the first of April measurements could justify. However, April forecasts have developed the habit of reasonable accuracy. The snow-surveyors do not expect the over-all results of the snow-melt to vary greatly from the April prophesies.

Again there are possibilities of floods in the Northwestern states, while the drought in the Southwest, only slightly abated by the rains of last summer, continues. A slight shortage of snow in places was reported in the Columbia Basin in January. Only on the Flathead watershed of Montana and the Willamette of Oregon did the snow cover appear unusually high. Now, however, conditions in the Kootenai and Flathead drainages are such that, if cold weather and normal precipitation occur during the next several weeks, damaging high water along the main Columbia River will occur. If normal melting conditions prevail throughout the basin, the southern streams will peak before the northern ones reach a high stage. Therefore, under normal melting conditions, little high-water damage should occur down the lower Columbia. However, should the present heavy snow pack melt uniformly over the basin, causing the rivers throughout the basin to peak simultaneously, damaging high water should be expected along the main stem.

The extreme dryness of recent years in Arizona has now extended to New Mexico and southern Nevada. Unless benefited by an abrupt change of late-winter precipitation habits, they will be hard-pressed for water, especially toward the end of the irrigation season. Utah and western Colorado have much better prospects. The slopes east of the Rocky Mountains have good reason to expect a liberal supply of water.

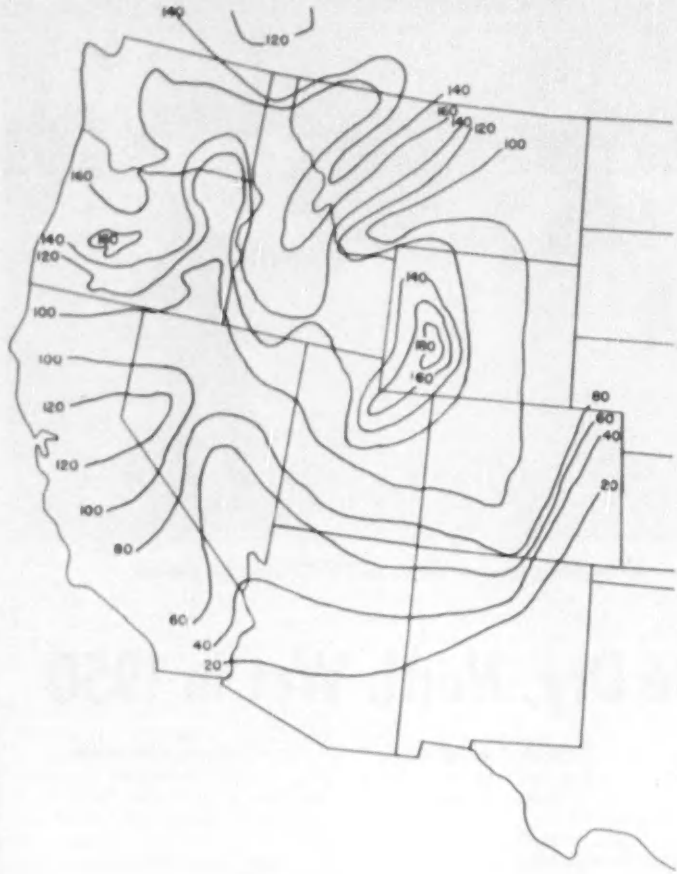
Forecast Summary by States

In the following paragraphs the prospects are described, state by state, as they were viewed on April 1.

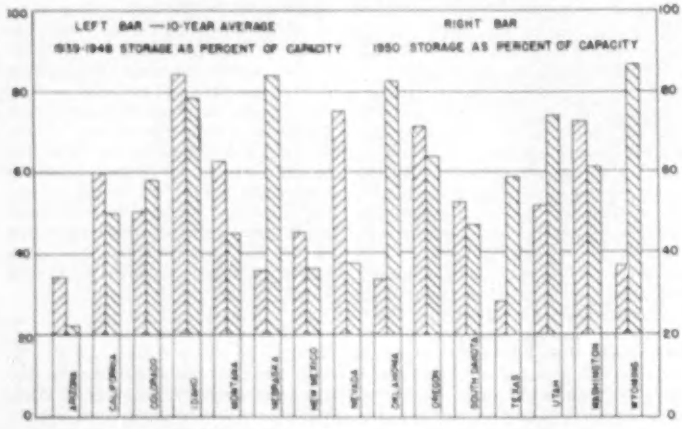
* The Division of Irrigation and Water Conservation is the federal coordinating agency of snow surveys conducted by its staff and many cooperators, including the Bureau of Reclamation, Forest Service, National Park Service, Geological Survey, various departments of the several Western States, irrigation districts, power companies, and others. The California State Division of Water Resources conducts and coordinates snow surveys in that state, while the British Columbia Department of Lands and Forests, Water Rights Branch, has charge of the snow surveys in that province.

Prospective April-September Stream Flow

Figures are per cent of 1939-48 average



Storage Situation in Western Reservoirs



Arizona—Snowfall has been far below normal. Verde and Salt River drainage areas had only about one-third normal snow cover, and Gila River area one-fifth of normal. As of April 1, there is practically no snow remaining on the watersheds of the state. Because of these poor snow conditions, the stream flow into the principal reservoirs has been disappointing. The Verde peaked at about 2,500 cu. ft. per second, but only for a couple of days. The Salt never did peak. It has constantly run between 400 and 700 cu. ft. per second for about two months. The Gila River flow has been so low that water users have been constantly drawing on the San Carlos reservoir storage.

As of April 1, the reservoir storage in the state is at 20% of capacity. It would be far below this amount had there not been a good run-off in 1949.

California—Sierra snow pack on the first of April indicates that deficient stream run-off will occur in the San Joaquin River basin from the Merced River south for the fifth consecutive year. The pack on the Tuolumne, Stanislaus, and Mokelumne watersheds is about normal. Watersheds of the Sacramento indicate conditions are also favorable and snow-melt run-off should be close to normal. In Sacramento-San Joaquin river basins there should be enough water to fill all reservoirs except Shasta and Millerton, with water spilling at peaks of the snow-melt run-off. Lake Tahoe is expected to reach 6,226.65 level. (Prospects as of April 1 were somewhat improved by storms early in the month which precipitated rain in the valleys and snow in the mountains, in substantial amounts.)

Colorado—Snow cover is near normal in most sections. Fall precipitation in the mountains was deficient, and the soil under the snow is dry. Summer run-off is expected to be slightly less than the current snow cover would indicate. On the Sangre de Cristo Range, between the Rio Grande and Arkansas watersheds, the snow cover is very low. The snow-melt season flow of these streams will reflect this condition.

The soil moisture in irrigated areas east of the Continental Divide is low, owing to a lack of snow on the plains and in the valleys during the past winter. On the western slope, valley precipitation has been below average, but soil conditions are good. Reservoir storage is above average on the South Platte and Rio Grande watersheds and slightly below average on the Arkansas.

Idaho—The present snow pack appears to assure adequate water for all requirements of irrigation and power throughout Idaho. April 1 snow sur-

veys show the snow cover to be above normal, heavy snowfall having occurred since the surveys of January, which showed a snow pack of less than normal in more than half of Columbia Basin.

Montana—The outlook for the Upper Missouri River basin is good. Snow measurements in the Jefferson and Gallatin basins show conditions slightly below average, but those for the Madison are above average. Storage is generally good, and with the proper operation of reservoirs, there should be ample water even for late irrigation. Although there are some deficiencies at low elevations, the bulk of the snow appears to be high in the mountains, for late release if the melt season is normal. The Upper Columbia River basin also appears to be in excellent condition. Many snow courses in this basin have a record high-water equivalent, the measurements being higher than either 1948 or 1943. Once again, for the third consecutive year, a flood potential exists in the Upper basin, particularly on the Flathead and Kootenai watersheds. The main stem of the Yellowstone River in southeastern Montana is in only fair condition. The snow pack in the tributary basins to this stream indicate about 80 to 160% of average snow pack. Although the conditions are not as critical as those farther south, water will not be plentiful for irrigation.

Nevada—Snow-water run-off in Nevada will vary from about 80 to 115% of normal in the eastern Sierra, while Humboldt Basin streams will flow from 65 to 115%. The southern two-thirds of the state can expect very little water from snow melt, as the snow surveys indicate that during the past winter many areas received their lowest recorded snowfall. Ground-water storage is better than at this time last year but still below normal, while early-season stream flow has been normal or above. Reservoir storage, while better than last year, is only 40% of capacity and 50% of the past 10-year average. Lake Mead contains about the same amount of stored water as at this time last year, and about 90% of normal for this date.

New Mexico—The snow cover in northern New Mexico is very low, many snow courses producing the lowest snow measurements since surveys were started in 1937. With only normal snow cover on the Upper Rio Grande in Colorado, the summer flow of the Rio Grande and its tributaries is expected to be from one-fourth to one-third that of the past 10-year average. Storage in Elephant Butte and Caballo reservoirs is about 30% above April 1, 1949, but below the 10-year average. On the basis of current outlook for the flow of the Rio Grande, there will be a substantial drop in storage during the next year. Soil moisture in all irrigated areas is reported as dry.

Above, surveyors prepare to take snow measurement. Below, core is being weighed to determine water content

Oregon—The outlook is universally favorable, with prospects of supplies nearly equal to those of 1943 and 1946 and better than those of last year in some areas. Deficiencies are not expected anywhere if the snow melt and run-off take a normal course. New run-off records will be established in the Deschutes watersheds, and unusually high flows are expected in Willamette River tributaries draining the western Cascade slope from the Coast Fork and Row River northward to and including Santiam River. The condition of storage is generally satisfactory, although below the average of the past ten years.

Utah—Wide variation appears in the water-supply prospects. The water supply is excellent in the northern and northeastern part of the state, good in the central part, and fair in the southern part, except for the East Fork of Sevier River, where the expected water supply is poor. The snow blanket in the Cache-Wasatch-Ashley forests has a considerably higher than normal water content and could produce heavy spring stream flows if combined with heavy rains and/or above-normal temperatures. Reservoir-storage supplies are near or considerably above the past 10-year average.

Washington—Prospects already summarized for the Columbia River basin are those of Washington. They are generally favorable, though holding some possibility of high run-off if climatic conditions are not in normal adjustment during the melting period.

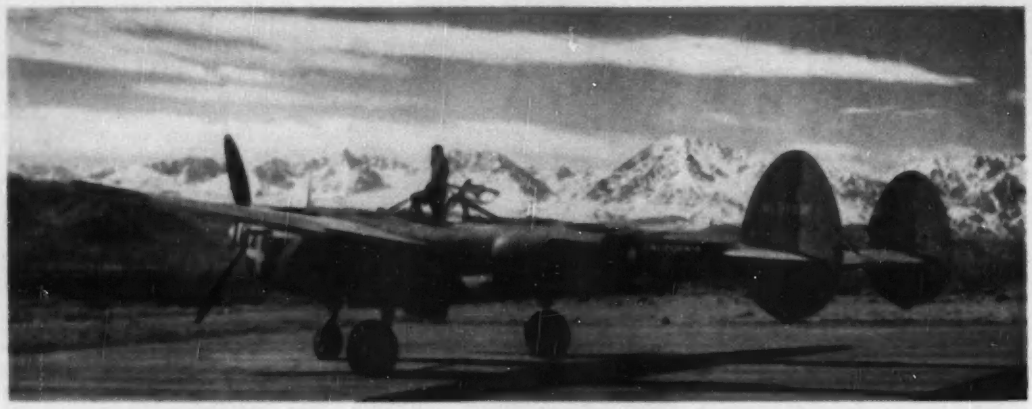
Wyoming—In northern Wyoming, the snow pack of the Wind River basin above Riverton appears to be in excellent condition as does the Popo Agie River basin above Lander. The Big Horn watershed below Riverton also has a fair snow pack and the river will carry about the average volume for the run-off season. However, in northeastern Wyoming, the Tongue and Powder basins do not share in this prosperous snow pack. The eastern slope of the Big Horn Mountains has only about 60 to 80% of average snow pack. That section is likely to feel an irrigation shortage before the summer is over. Late spring or summer rains may help, but a rather critical condition exists.

The outlook for the Green and North Platte watersheds is excellent. On the headwaters of the North Platte and Laramie rivers the snow cover is slightly above normal. West of the Continental Divide on the Green, the high-mountain snow cover is 50% above normal and well above that of April 1, 1949. Soil moisture on the range and meadow lands of the Upper Green is excellent.

On the North Platte, the irrigation supply for eastern Wyoming and western Nebraska is assured, owing to a record carry-over. Storage in the four major reservoirs now totals 1,675,000 acre-ft., or 73% of capacity. However, soil moisture is very low.

British Columbia—The April 1 snow survey showed no indication of general thawing. There has been little run-off, as the weather continued cool and cloudy. The snow is deep, and of low density. About half the results indicate the greatest measured snow-water content on record. The water-supply picture for the Columbia River basin in British Columbia is therefore very good, with all prospects well above normal, provided normal temperatures and precipitation prevail until and during the run-off period. If the weather during April and early May continues cloudy, cool, and with even normal precipitation, a definite flood potential will exist.

This is the water supply outlook for 1950.



Artificial Rain Making Pays Off

Winding up its third season of artificial nucleation flights, California Electric Power Co. has increased run-off by 12 to 14 per cent

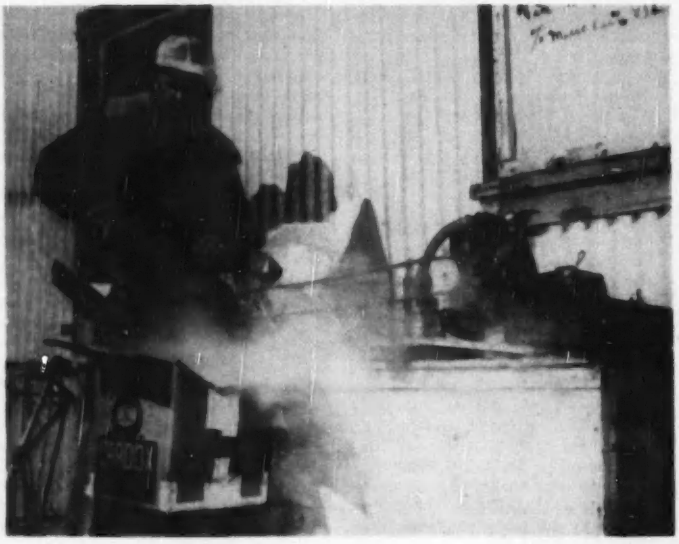
Albert Cage

President, California Electric Power Co., Riverside

ARTIFICIAL nucleation of clouds by dry ice can make it possible and economically profitable to coax "bonus" precipitation out of cloud formations which would ordinarily pass overhead without depositing any moisture. California Electric Power Co. is now in the third season of successful operation of such a program in the High Sierra some 200 miles north of Los Angeles. During a seven-month period from October 1948 to May 1949, artificial nucleation netted an estimated bonus precipitation of 6,500 acre ft. in the Bishop Cups area, where the company has five hydro plants. This precipitation in the 5x20-mile watershed can generate 14,300,000 kwh.

Dry Ice, Silver Iodide Considered

The program was started in the fall of 1947 under the direction of S. A. Cundiff, who had followed closely the work done by Dr. Irving Langmuir of General Electric. At first both the dry ice and silver iodide methods of cloud nucleation were considered. The latter was discarded because silver iodide must be seeded below the clouds for best results. Unusual Sierra thermal condition, plus the requirement that precipitation be pin-pointed in the 5x20-mile area ruled out the release of silver iodide from the



P-38 plane (above) ready to take off on cloud seeding flight. Preparation of dry ice (below) is a particular operation. On opposite page—Loading dry ice in readiness for the take-off

Clouds averaging 3,000 ft. or less in thickness are seeded with dry ice particles the size of rice grains to form snow

ground. Since most of the time the clouds actually encompassed mountain peaks, it was practically impossible to release the vapors from an airplane. Dry ice was therefore chosen.

P-38 Meets Altitude Requirements

Actual flights began in the winter months of 1947-48. Since some clouds were more than 15,000 ft. from top to bottom over a mountain range with crests up to 13,000 ft., an airplane capable of operating up to 30,000 ft. was required. To meet this requirement the company purchased a war surplus P-38 which has operated efficiently under all weather conditions. Cost estimates on "operation snowfall" must be tempered by the fact that the P-38 was purchased as surplus, and to replace it at present-day prices would increase costs considerably. On the basis of actual seeding flight hours on the project, costs average $200 per hour. Results of the program place the operation well in the black side of the ledger.

Company records going back 40 years have been used to evaluate the effectiveness of the cloud nucleation program. Company engineers use these data to correlate actual snow pack measurement at lower elevations, and estimate run-off precipitation from the snow pack in the inaccessible back country in the area. From year to year these estimates have been within one per cent of the actual run-off.

Effectiveness of Program

At the end of flight operations of the 1947-48 winter season in April 1948, the estimate was made as usual. Actual run-off showed a 14% increase due to the additional "bonus" snow dropped at the high elevations. In 1949 (a cold winter with little natural moisture), run-off was 12% over the April estimate.

It is believed that the method will add to the permanent snow pack reservoir enough precipitation to permit full-scale operations throughout the year, even during dry year cycles. Admittedly, figures compiled over a two-year period are not conclusive, but they definitely indicate that the seeding program is profitable. In addition to the snowfall dropped into the company's watershed, an appreciable but unmeasured precipitation has dropped in adjoining areas.

Temperature, Moisture Conditions

Successful nucleation flights require specific temperature and moisture conditions in altostratus and cumulostratus clouds. Cooperation of the U. S. Weather Bureau in furnishing detailed meteorological information has been invaluable in determining these conditions. The plane does not go up unless there is a reasonable expectation that the right conditions exist. During the 1948-49 winter season, for example, only 21 flights were made.

When reports indicate that supercooled clouds with temperatures ranging below 32° F. are present, the pilot and his assistant prepare to go aloft. A large block of dry ice is ground to the proper size, as determined by the thickness of the cloud. Clouds averaging 3,000 ft. and less in thickness are seeded with dry ice particles the size of rice grains. Larger clouds ranging from 3,000 to 15,000 ft. require pieces ground to the size of a human thumb. Normally 75 lb. is taken on a single trip, although not that much is used.

Seeding Operation

The dry ice is stowed in a regular ice carton and loaded in the photographer's cockpit in the nose of the plane, where the assistant also rides. When the pilot climbs above the cloud formation he first makes a check run through it, estimating the moisture in the cloud and observing the amount of ice that collects on the leading edges of the wing. Usually he follows this with a short trial seeding run to watch the effect and to determine wind drift. Drift is important since the snowfall must be pin-pointed into the comparatively small area of the 5x20-mile watershed.

When the pilot is satisfied that conditions are right and that he has a fair chance of dropping the snow where he wants it, he makes his seeding run at about 220 m.p.h. The as-

sistant in the front cockpit seeds the cloud by ladling out five to seven pounds of dry ice down a spill pipe in the nose of the plane.

Mechanics of Precipitation

Success depends not only on the cloud itself, but on the experience of the pilot and his assistant. If too little dry ice is used, snow does not fall in sufficient quantities. If too much is used, nothing happens — for this reason:

When the dry ice hits the supercooled cloud it changes the water droplets to ice crystals as it passes them. Even though the temperature in the cloud is below freezing, the droplets up to this point have not frozen because of the lack of nuclei to start the freezing process. The dry ice furnishes the needed nuclei. As the newly formed ice crystal has a lower vapor pressure, it attracts other water droplets which adhere and then break off as snow flakes, thus setting up a chain reaction. This process releases heat energy which creates an updraft and suction that draws in more moisture-laden cloud masses. This accounts for the phenomena of seemingly peaceful cloud formations being transformed in a matter of thirty minutes into a seething storm mass. If too much dry ice is introduced, however, it changes all of the water droplets into ice crystals and the cloud is dissipated.

Special Conditions Important

In artificial nucleation, California Electric Power Co. feels it has a partial answer to the long-time problem of ample water reserves. Before others rush in and adopt it as a panacea, however, it is important to note that several special conditions contribute to success of the present operations. The particular combination of nearly ideal meteorological and geographic conditions, plus the right equipment and a background of practical experience, are all vitally important factors in success of the program.

Before "operation snowfall," the Piute Indians of the Bishop area were looked upon as infallible weather prophets, predicting with uncanny accuracy when and how hard it would storm. Now if a Piute is asked if it will storm he may well answer, "Can't tell—P-38 hasn't gone up yet today!" The Piute understandably may be confused, but California Electric is confident that artificial nucleation is the answer in this particular case, and intends to continue with the program as a regular part of the company's operations.

Boulder lines develop cases of conductor segment failure after 15 years

Vibration Fatigue Hits

Experience indicates that vibration is universal in conductor design

Los Angeles tests have resulted in an entirely new concept of problem

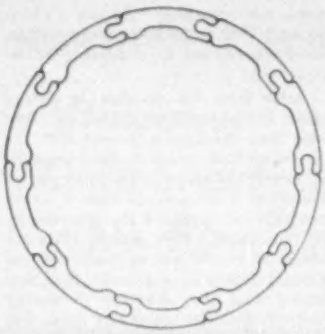
C. P. Garman

Chief Electrical Engineer, Deputy General Manager
Los Angeles Department of Water & Power

DESPITE extraordinary efforts taken in the design of the Boulder transmission lines to prevent damage to conductors from vibration, eight cases of conductor segment failure have been found recently. Failure apparently resulted from vibration fatigue. This has prompted a program of testing that will determine why vibration of the conductor is greater now than it was 15 years ago when the lines were built. The tests will culminate in taking steps that will limit the vibration in these circuits.

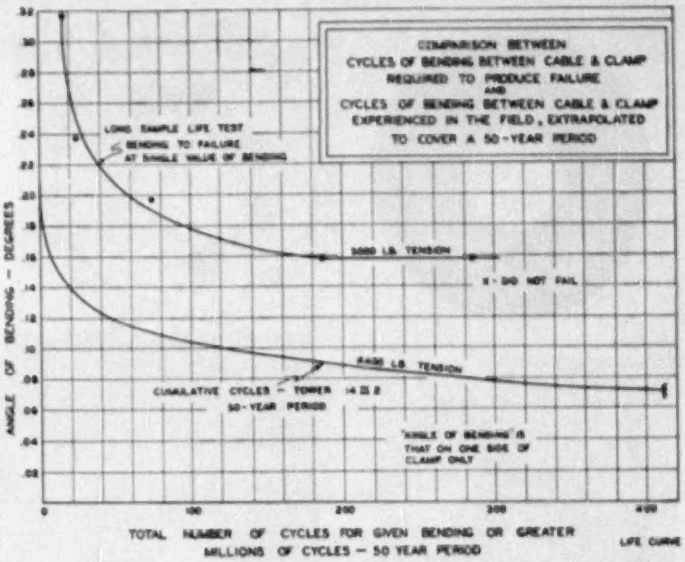
These tests already have given a clue to the situation by confirming the existence of an effect noted in the early vibration life tests. This effect was discovered during labratory work in which the cable was forced mechanically to vibrate to the point of failure. It was noted that the amount of energy required to vibrate the cable at these high amplitudes decreased with time as cycles of vibration accumulated on the sample. This effect was not considered of importance at the time. The amplitudes involved in these breaking tests were much larger than any amplitudes found by actual field measurements, to be incited by natural means in operation.

The first case of segment failure was discovered on Nov. 4, 1949, while making a routine patrol of the Hoover Dam-to-Los Angeles 287.5-kv. transmission lines by helicopter. A discontinuity in the appearance of the conductor was observed at a point over the flat desert country near Victorville, Calif. An immediate landing and close inspection revealed the first case of segment failure to be discovered in



1—Cross-sectional conductor diagram

3—Torsional-type vibration damper


COMPARISON BETWEEN
CYCLES OF BENDING BETWEEN CABLE & CLAMP
REQUIRED TO PRODUCE FAILURE
AND
CYCLES OF BENDING BETWEEN CABLE & CLAMP
EXPERIENCED IN THE FIELD, EXTRAPOLATED
TO COVER A 50-YEAR PERIOD
LONG SAMPLE LIFE TEST
BENDING TO FAILURE
AT SINGLE VALUE OF BENDING
5000 LB. TENSION
X - DID NOT FAIL
4400 LB. TENSION
CUMULATIVE CYCLES - TOWER 14 ☒ 2
50-YEAR PERIOD
ANGLE OF BENDING IS
THAT ON ONE SIDE OF
CLAMP ONLY
ANGLE OF BENDING - DEGREES
TOTAL NUMBER OF CYCLES FOR GIVEN BENDING OR GREATER
MILLIONS OF CYCLES - 50 YEAR PERIOD
LIFE CURVE

2—Curves compare what cable could stand with what it would be subjected to

Boulder Transmission Lines

the conductor of these lines since the circuits were installed. Although this segment failure was promoted by a bad come-along mark left on the conductor from the initial stringing operations, it nevertheless was a vibration break. It therefore prompted a thorough inspection program over these important lines.

Eight Cases Discovered

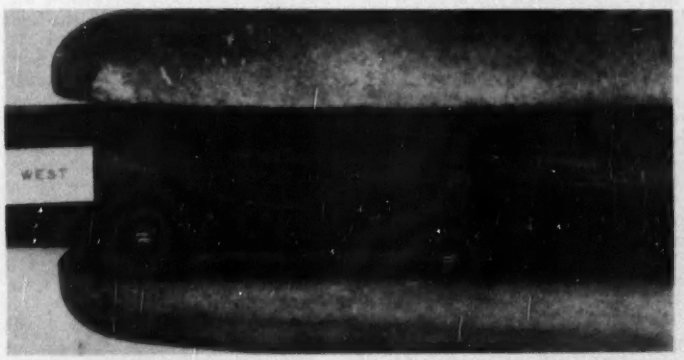
At the time of this writing (April 1) the inspection program was about 55% completed. Eight cases of segment failure from conductor vibration had been discovered. With the exception of the first case, all subsequent discoveries of segment failure were made on sections of the line that have been in service for 15 years. No cases of complete conductor failure have occurred because of careful patrol and the high factor of safety used in stringing tensions.

The conductor selected for the line was the unique 1.4-in. diameter type-HH copper conductor of interlocking tongue and groove segmental construction. Its smooth surface and hollow, self-supporting features, satisfied the low corona-loss requirements without a premium in uneconomical copper cross-sectional area. A cross-sectional diagram of the conductor is shown in Fig. 1.

Vibration Tests

Consistent with the thorough investigation of the design factors for this line were the elaborate conductor vibration tests carried out from 1933 through 1938 at Stanford University, in the laboratory of the General Cable Corp. (manufacturer of the cable), at line locations in the field, and at the testing laboratories of the Department of Water & Power in Los Angeles.

At Stanford University, vibration of the conductor was studied using a 50-ft. sample suspended in a wind tunnel. Vibration characteristics of the cable were also investigated by delicate measurements of the amount of power required to vibrate the cable throughout the gamut of frequencies and amplitudes. The Department of Water & Power supplemented the Stanford tests with field and laboratory set-ups. A field installation near the present Silver Lake switching station of the line was made. This was believed to be one of the locations along the line most conducive to conductor vibration. Measurements of naturally incited vibration at this, and later



Typical break in segment of type HH 1.4-in. conductor. Removed Feb. 12, 1950

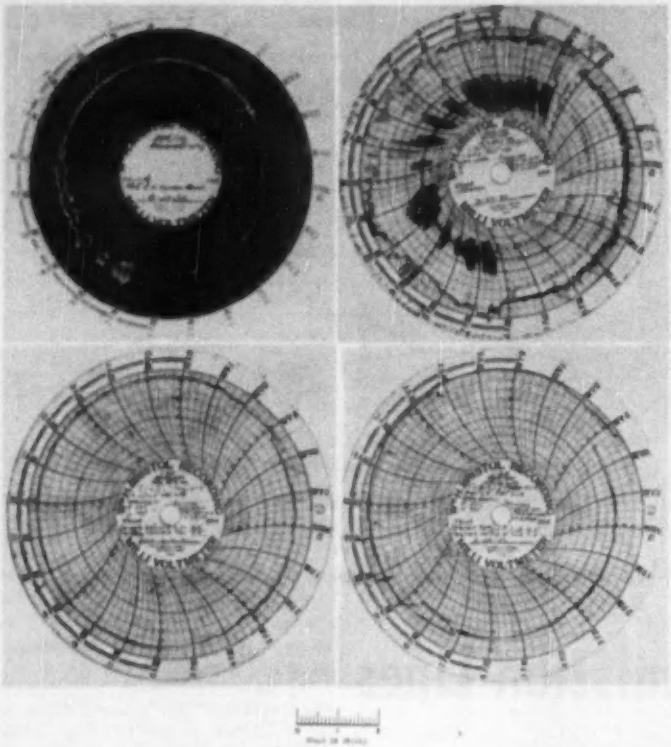


Chart at upper left indicates vibration when conductor was installed in April 1936. Chart at upper right shows the same conductor at the same location practically 14 years later. Note that the amplitude of the vibration shown on the inner record of chart has increased considerably since conductor was installed. This tends to bear out findings during the Stanford tests that less energy is now required to vibrate the conductors than when they were new Outer graph on this chart indicates wind velocities. The two charts below indicate vibration after addition of Stockbridge dampers. Amplitude scale applies to all charts. Dampers have reduced vibration to negligible amount

at another line location, were made by elaborate photographic film recorders. Some 200,000 ft. of film record showing direct traces of conductor movement were obtained and analyzed during a two-year period. A determination was made by the relative occurence of various vibration frequencies. Maximum and normal amplitudes at each of these frequencies that would be expected to occur in a 50-year period were determined. In addition, a series of laboratory tests was made by the department in which cable samples were forced by mechanical means to vibrate to much higher amplitudes than were found in the field tests. Vibration at these high amplitudes was continued until cable failure occurred.

From these field and laboratory data, the curves shown in Fig. 2 were plotted. These show the cycles of bending required to produce failure and the cycles of bending experienced in the field extrapolated to cover a 50-year period. From these curves it was possible to make a comparison of what the cable could stand and what it was expected to be subjected to in the field. This comparison indicated that the possibility of failure of the cable from naturally incited vibration was remote and that there was ample factor of safety against failure in the 50-year period.

It was during this elaborate testing program that a torsional-type of vibration damper making use of inter-segment friction was developed as being a particularly effective vibration limiter for type-HH cable. A photograph of this damper is shown in Fig. 3. As an extra precaution against conductor failure, this damper was actually installed on the line in selected locations covering about 15% of the line length. Locations were chosen by surveys with amplitude-recording devices which showed that conditions were particularly conducive to conductor vibration.

Aside from the decrease in energy effect first mentioned above, all other tests had universally shown that the conductor took relatively large amounts of energy to cause it to continue in vibration. They showed that it would normally be expected that the energy in the wind which incites vibration would be insufficient to cause any but a small degree of amplitude. It is now known that this decrease in energy discovered in the laboratory set-up has a real importance. It is believed that the slight degree of bending to which the cable has been subjected in the past 15 years has made it become more flexible. Therefore, it has become more subject to vibration in service. In addition, the tests now under way have shown that the torsional type of damper has lost some of its effectiveness because of the changed characteristics of the conductor.

Then of course there is the weather with its ever changing and proverbially non-predictable characteristics. It was impossible to survey the wind conditions over the entire 325 miles of right-of-way for this line. Even if such a survey were made today, the vagaries of the weather make no guarantee that these conditions would be the same tomorrow. The line traverses mountain, plain and desert. There are undoubtedly many new locations along the line where conditions are particularly conducive to inciting vibration under the present more flexible condition of the conductor.

In view of all of these factors, investigation is continuing to determine the present and complete vibration characteristics of the conductor. Also being determined are proper characteristics of a suitable vibration damper, and selection of additional locations along the line where the application of such dampers is most essential to prolong the life of the line.

This article has stated frankly the situation with respect to conductor vibration on the Boulder lines. It should allay any rumors about failures and dire consequences. It indicates that conductor vibration is a universal problem in transmission-line design—a problem that is common to all types of conductor now in use. Vibration is a problem that respects no particular type of conductor—who manufactures it or who uses it. The Los Angeles experience has developed an entirely new concept of the vibration problem. It may well be that vibration dampers of satisfactory original design and characteristics for a new line will not afford adequate protection after a period of years.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 66

SUBJECT:	Hammer-type Hog Fuel Mill
CUSTOMER:	Hammond Furniture Co. Ltd.
TYPE OF BUSINESS:	Furniture Manufacturer, 300 employees
SERVICE COMPANY:	B. C. Electric Co. Ltd.
DATA PREPARED BY:	D. A. Hazelwood

Ball type hog fuel mill has no knives. Fuel produced, below, has uniform texture

A hammer mill of the type used to shred automobile tires in the reclamation of rubber has been installed to produce hog fuel at the plant of the Hammond Furniture Co. Ltd. of Vancouver, B. C. Chief advantage of using a hammer mill instead of a knife mill is the fact that it requires little or no servicing or sharpening, regardless of the passage of nails or small pieces of metal. The mill is driven through a flexible chain coupling by a 40-hp. General Electric type K, 1,170-r.p.m., 440-volt 3-phase induction motor. Coupled to the opposite end of the mill shaft is a 125-lb. cast iron flywheel, 24 in. in diameter and 4 in. thick. The flywheel is designed to store enough energy to assist the motor through the peak demand of a heavy charge. Average loading of the motor is 60 to 80%.

This mill will produce in an 8-hour day approximately 15 units (200 cu. ft. per unit) of hog fuel from slabs of maple, alder, cottonwood, veneer, and yard cleanings, including nails. Maximum size of charge is a piece 4x12in.x3ft. The unit is operated by two men at present. With proper arrangement of scrap piles, it could be operated by one man.

The hog fuel mill was installed primarily to provide a suitable means to rid the plant and adjacent hardwood sawmill of waste wood products and to solve the waste products problem. Hog fuel is carried by worm screw and bucket conveyor to the top of a storage bin. A single 7½-hp. motor drives both conveyors. Dry sawdust is stored in an adjacent bin. Separate screw conveyors discharge fuel from these bins into a pit. A bucket conveyor takes it to the furnace hopper. Separate conveyor controls permit adjusting the mixture of damp hog fuel and dry sawdust. Screw conveyors take the fuel from the hopper to two 91-boiler hp. boilers.

Operating Data

Product: 15 units of hog fuel per day.
Labor: 16 man-hours per day.
Operation: 8 hr. per working day.
Consumption: Approx. 200 kwh. per day (including depositing fuel in storage bin).

Electrical West—Vol. 104, No. 5

Wiring Must Be Simplified Says Architect

Walter R. Hagedohm, prominent architect, says it is disappointing to find the electrical trend to be for bigger, better and more conduits and antiquated service connections. He challenges the industry to simplify wiring.

A. B. Smedley, qualified electrical engineer, says wiring can be simplified. He outlines a simplified wiring system that would save large quantities of materials, bring about revolutionary changes in present practice

The Architect:

TO meet the requirements of contemporary architecture, to aid that architecture in realizing its greatest potentialities, ways and means must be found for developing a more simple and direct method of providing power for lighting and other electrical facilities. Human nature and imagination is generally limited to develop along traditional or familiar lines. Thus the first automobiles had not only the dash boards which wagons used to keep the horses' tail (among other things), out of the laps of the occupants, but also the whip socket. Even today in our new streamline cars the instrument panel is called the dashboard. In lighting, the candle on the kitchen table was the center around which the family gathered. The same arrangement followed with the oil lamp. The candles and oil lamps in decorative manner were placed in chandeliers in centers of rooms. When gas light became available, they still used the same location. When electricity was introduced, the same gas fixtures were used. By dint of main force, it is finally conceded that light sources are placed where light is required.

The problem now is how to simplify the entire procedure. To arrive at any solution to this problem, it would be well to consider the trends in contemporary architecture. In short these trends may be summed up as follows:

1. Simplicity in plan workability, or "functionalism."

2. Flexibility for easy use and for economical transition into other uses, or, new methods of merchandising for instance.

3. Recognition of the extreme importance of texture, color and proper use of materials.

4. Economy as a dominating factor in initial cost as well as in maintenance. This factor is developed mainly by careful design architecturally and structurally.

5. Incorporation of the best and newest mechanical features.

6. Last but by all means not least a striving for real beauty. The ability to instill proportion, scale, color or "soul," if you will, into a building is the art of the architect. This is the "plus" an architect can give every building. It is the main reason for his existence.

Bigger, Better and More Conduits

It is disappointing, to say the least, to find it necessary in producing buildings with the trends above mentioned to find the electrical trend to be for bigger, better and more conduits, lights with awkward gadgets for starters, antiquated service connections. It would seem that the conduits were necessary for supporting the building! Try and find a flush lamp which will fit into thin fin marquees! Fixtures are usually built for light with accent on glare, and not for beauty and light distribution. It is clear then that need for study in new forms, new designs and new modes of living is crying out in the electrical field.

Crystal ball gazing can bring to view Buck Rogers innovations. There is much room for junior Edisons. Codes, of course, will bring stumbling blocks. Selfish interests will not be amenable. However, if electrical usage is to develop fully in the future, the following must be brought about: (1) Greater simplicity and simplification in fixtures, fittings, and transmission. (2) More beauty in design considerations. (3) New methods of distribution from mains throughout individual buildings with radionic or electronic control, with selectivity as in radio and television.

The use of electricity has already greatly influenced and affected architecture. The magnitude with which this influence will continue to aid the new architecture will depend upon how fully and from what new approaches the various electrical facets will be developed for utility and for beauty. It will depend on the vision and ingenuity of the industry. Much remains to be explored in the electrical field. There are many new frontiers for greater development.

Walter R. Hagedohm is a member of A.I.A., past president State Association of California Architects; director, Southern California Chapter of American Institute of Architects; radio commentator; lecturer on home and business planning for State Department of Education.

A. B. Smedley, E. E., is a practicing consulting engineer of Pasadena; graduate of the University of Cincinnati. Well known as a sponsor of Adequate Wiring and for his development and fostering of the low-voltage control principle for customer convenience and to improve wiring adequacy. He is well identified in the distribution and industrial power engineering field through lectures before various technical societies. This, his most recent manuscript, was prepared in response to the challenge placed before the industry.

It Can Be Done Says The Engineer

The Engineer:

IT seems that we in the electrical industry have been in a rut. The job of delivering electricity to the outlets for the greater loads and increased uses of today, has been on the basis of installing "more of the same." That applies to every job from residential through the largest commercial installations. More of the same small wires, more of the same small conduits and bigger and better panelboards has been the order of the day. Push-button wiring (ELECTRICAL WEST, May 1946) and *Electrical World*, May 11, 1949) for the elimination of switch legs and their conduits has made slow but persistent progress in the right direction. Meanwhile, those who have had Adequate Wiring in their hearts, have been plugging away at the slow process of selling the use of No. 12 wire instead of No. 14 wire. So, right now—today—we are using 17,000 lb. of rigid conduit for every 1,000 lb. of copper. Except, of course, we use even more conduit if No. 12 wire is used for adequate wiring because it will not be loaded to its ability to carry current.

Different Basic Approach

Here, a different, although not new, basic approach to the design of a simplified wiring system is outlined. This is a basic conception, not a finished design and its purpose is to encourage constructive thinking on all possible solutions to the 17 to 1 ratio. This simplified wiring system will have its critics. But even the most pessimistic will soon discover that the clear-cut advantages will outweigh the problems. The authorities who have prepared our Electrical Safety Orders and our Codes and Ordinances have been far sighted in providing for many avenues of progress as the future becomes today's problem. So it is with this simplified wiring system, basic provisions already exist. A few combinations of devices already developed, and the system can be installed forthwith.

A Simplified Wiring System

The simplified wiring system consists of one or more heavy loop feeders which will serve all outlets (Fig. 1). The circuit breakers will be removed from load centers and panelboards to the outlets. Each outlet will have its own breaker. Many possibilities are at once obvious. However, let us examine each component in turn to exhaust every question and develop every advantage. The real intent of the system is to eliminate as many conduit runs as possible and to improve the ratio of 17,000 lb. of pipe to 1,000 lb. of copper (Fig. 2). That is a gross weight of 18,000 lb. for a payload of 1,000 lb. of copper. Copper is the thing we want to install. Little wonder that we are accused of doing it the hard way. A quick examination of Table 1 shows a ratio of 3,600 lb. of pipe for 1,000 lb. of copper for 1½-in. pipe and No. 1 copper. For larger wire and pipe sizes, the ratio becomes less favorable. The copper utilization becomes much poorer. Other factors, such as rapidly increasing reactance, begin to enter the picture. All things considered, both electrical and physical, seem to indicate the choice of No. 1 wire and 1½-in. pipe. The system is well under way, 13,400 lb. of pipe* can be eliminated for every 1,000 lb. of copper installed. The ratio has dropped from 17 to 1 to 3.6 to 1. Considering the many circuits of the present method that have been increased from ½ in. to ¾ in. for larger wires to reduce voltage drop, 17,000 lb. of pipe for 1,000 lb. of copper is a minimum figure. The 3,600 lb. of pipe to 1,000 lb. of copper for the simplified system is a maximum figure. With this ratio of 3.6 to 1, at least 13,400 lb. of pipe will be removed.

The design of the system shifts at once from a voltage drop basis to one of carrying capacity and operating temperature. In present practice, more and more branch circuits with larger than No. 14 wire are used to obtain better voltage regulation. Larger wires require larger pipes too. In the simplified system there are no branch circuits. The copper in No. 14 wire carries 2¼ times as many amperes per unit as does the copper in No. 1 wire. With No. 1 wire the voltage will be good at every outlet. The loop circuit assures even better voltage. Compare the figures in Table 2. The simplified system now has copper to spare. A high temperature insulation is called for to make better use of the copper. With type "AVA" wire, Table 3, the same total amperes can be carried in four 1½-in. conduits as can be carried, by present methods, in forty ½-in. conduits and still have 50% more copper in the system and six tons less pipe for every 1,000 lb. of copper. Type "AVA" wire costs nearly twice as much as varnished cambric braid wire and has a carrying capacity of only 14% more. Therefore, of the presently available cables, varnished cambric braid can be used to gain almost 90% of the economies thus far outlined for the simplified wiring system.

Some new applications for presently developed devices will be used on the loop feeders. The feeders may be in-

* Comparisons in this article are on the basis of rigid conduit. Even on the basis of EMT in ½ in. and 1½ in. sizes a saving of 38 circuits and 2½ tons of pipe per 1,000 lb. of copper can be made by this system.

FIGURE 1

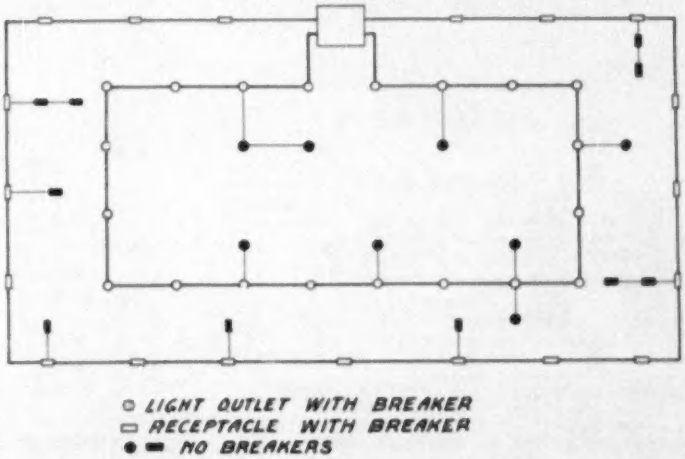


TABLE I

PIPE SIZE	WIRE SIZE	NO. WIRES	TOTAL AMPS	WEIGHT 1000' PIPE	WEIGHT 1000' COPPER	RATIO IRON/COPPER	RATIO IRON/AMPS	RATIO COPPER/AMPS	RELATIVE E DROP
1/2	14-R	4	48	852	50	17.0	17.7	1.02	3.0
1/2	12-R	3	60	852	60	14.2	14.2	1.00	3.2
3/4	12-R	5	80	1134	99	11.3	14.2	1.24	2.6
3/4	10-R	4	96	1134	126	9.0	11.8	1.31	2.4
1 1/2	1-R	3	330	2731	760	3.6	8.3	2.30	1.36
2	1/0-R	3	375	3678	960	3.8	9.8	2.55	1.24
1 1/2	1-R	3	330	1141*	760	1.5	3.6	2.30	1.36

* Steel tube (EMT)

TABLE II

PIPE SIZE	WIRE SIZE	NO. WIRES	TOTAL AMPS	RATIO IRON/AMPS	RATIO COPPER/AMPS	RELATIVE E DROP
1½	1-R	3	330	8.3	2.3	1.36
1½	1-RH	3	390	7.0	1.9	1.64
1½	1-VC	3	420	6.3	1.8	1.75
1½	1-AVA	3	480	5.7	1.6	2.0
1½	1-AVA	3	480	2.4*	1.6	2.0

* Based on EMT

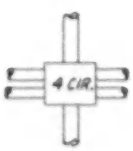
TABLE III

WIRE SIZE	RATED AMPS	C M AMPS	WIRE COST PER AMP	WIRE COST PER AMP*
14-R	15	273	.53	.53
1-R	110	760	1.08	.39
1-RH	130	643	.99	.42
1-VC	140	597	1.29	.59
1-AVA	160	522	2.25	1.17

* BASED ON EQUAL VOLTS DROP

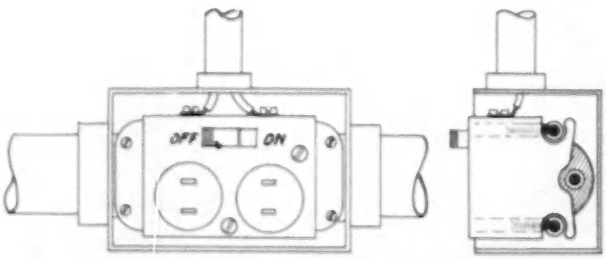
FIGURE 2

½" PIPE – NO. 14 WIRE
17,000 LBS OF PIPE
FOR EVERY
1000 LBS COPPER



1½" E M T - NO. 1 WIRE
1500 LBS OF PIPE
FOR EVERY
1000 LBS COPPER

FIGURE 3



LOOP CIRCUIT RECEPTACLE WITH BREAKER

stalled in regular standard 1½-in. conduit or perhaps an even better, less costly and lighter-weight gutter can be made. The outlet boxes will be designed for the best physical arrangement of raceway and the devices to be attached to the No. 1 cables. The convenience outlet device will be a single unit consisting of a duplex receptacle and a breaker. The low-voltage operated relay for lighting outlets or other controlled outlets, will be a single unit with a breaker built in. Some of these few devices have obvious interesting possibilities. Other devices and better ones will be forthcoming as more thought is given to the detail design for system coordination.

The combination duplex receptacle and breaker will give real protection for the first time. It is common knowledge that branch circuit breakers do not properly protect the cords and devices plugged in. Generally there is not enough short-circuit current available at the outlet to trip the breaker fast enough, indeed if tripped at all, to prevent a fire hazard on No. 18-2 cord. With the elimination of the branch circuit as used today, the simplified wiring system with heavy copper loop feeder will deliver ample short-circuit current at the outlet to trip the breaker magnetically and instantly. Life, property, cords and appliances will have complete protection. Utility men concerned with good customer service and service calls indicate that outlet protection would almost completely eliminate service calls. A combination unit of this kind may be made as illustrated in Fig. 3* Provision is made for short extensions from the main building walls into partitions for a limited number of closely related outlets, Fig. 4.

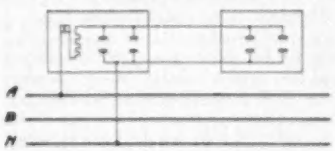
The magnetic switch for push-button control of lights has already been developed. All that need be done is to combine it in a single unit with a breaker which will be magnetically reset by the low-voltage control that operates the relay. Such a device is illustrated in Fig. 5*. This device and the receptacle unit could make use of the bayonet screw tap to connect the units easily to the heavy No. 1 wire loop feeders. Now switch legs have been dispensed with and more steel is saved. This device and system makes it unnecessary to have more than one lighting circuit in an area. Electrical failures in fixtures or wiring will isolate only the one outlet involved, not an entire branch circuit as in the conventional system.

A summary of the possible benefits to the consumer and to every branch of the electrical business will best crystallize the value of the simplified wiring system.

The simplified system reduces the weight of pipe, increases the amount of copper and provides inherent adequate wiring at a saving. Loop feeders for residential wiring would probably be smaller than No. 1. The same basic system, however, is sound for both residential and commercial use. In this system there is no idle copper, no circuits unused. No matter how large or small the load, all of the copper of the loop feeder is in use.

Raising of disadvantages will be left in the capable hands of the "You can't do it" gentlemen and those who live by the great dictator "Precedent."

FIGURE 4



PROTECTED LOOP TAP AND EXTENSION

* Designs copyrighted and patents applied for on basic designs.

BENEFITS

For the Architect:

1. Do the job with 4 circuits instead of 40 circuits.
2. Do it with 6 tons less pipe for every 1,000 lb. of copper.
3. Give better voltage.
4. Give better protection.
5. Provide adequate wiring.

For the Contractor:

1. An electrical job instead of a plumbing job.
2. Less structural interference.
3. Less possibility of errors.
4. Easier trouble shooting.
5. Expanded use of electric power.
6. Provide adequate wiring.

For Wire Manufacturers:

1. A more profitable type of wire.
2. Uses at least 50% more copper. (Simplified system could use a better and lower priced wire for 160 amp. in No. 1 gage.)
3. Reduces cost of packaging, warehousing and merchandising by reducing use of small wires.
4. Provide adequate wiring.

For the Equipment Manufacturer:

1. New devices are the life blood of sales in a buyers market.
2. New devices combinations of presently developed parts.
3. Breakers for every outlet instead of one for each branch circuit.
4. Magnetic switches with a breaker at every fixture outlet.
5. New boxes and raceway possibilities.
6. Provide adequate wiring.

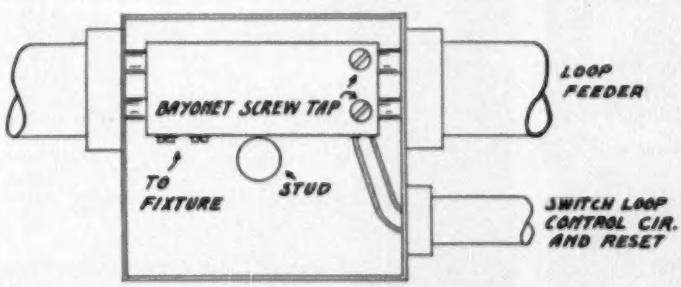
For the Utilities:

1. Reduction in service calls.
2. Better outlet voltage means full power consumption by all utilization equipment.
3. Provide adequate wiring.

For the Consumer:

1. A substantial saving in cost.
2. More dollars for copper, less for pipe, insulation, coverings.
3. Perfect operation of consumer equipment.
4. Faults limited to single outlet.
5. Breakers closely associated with the fault.
6. Safety—heavy short-circuit currents trip breakers fast and protect cords and equipment.
7. Provide adequate wiring.

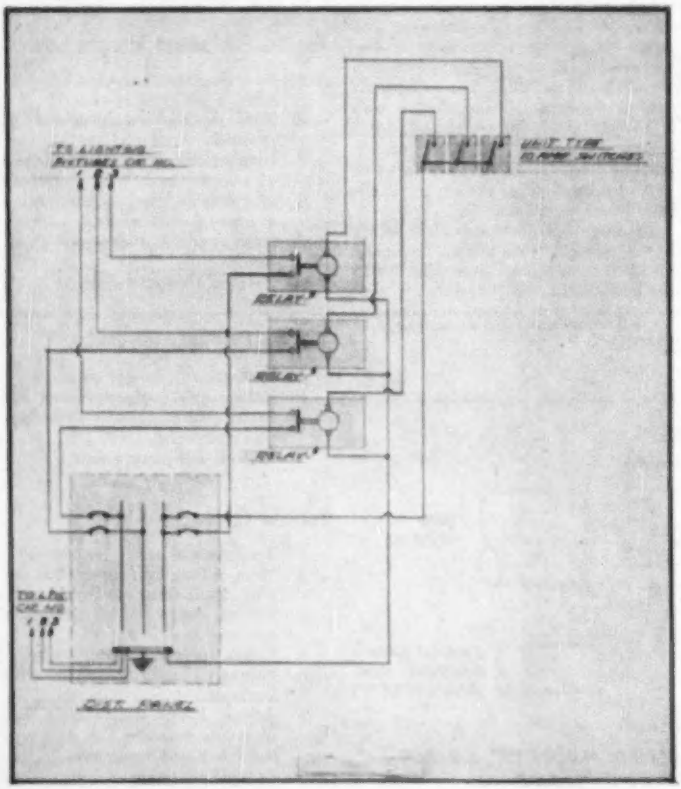
FIGURE 5



CEILING OUTLET WITH COMBINATION MAGNETIC SWITCH AND BREAKER - MAGNETIC RESET

Carnation's new Los Angeles world headquarters building (left) uses 480-volt lighting feeders with dry-type transformers. Lighting circuits are controlled by 110-volt relays. The lobby mural (right) presented a special problem

Electrical Features at Carnation Building



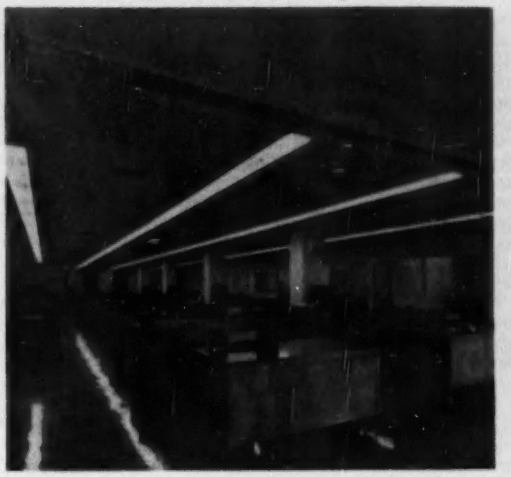
Wiring for 110-volt relays controlling lighting circuits. System made possible mounting six relay switches in space normally used by two standard switches

Lee Chambers

Chief Electrical Engineer, Carnation Co.

THERE are a number of interesting features of the wiring and lighting installation in the new 12-story world headquarters building of the Carnation Co. in Los Angeles. It is the third recent office building in that area to employ 480-volt feeders for both lighting and power distribution. Dry-type transformers step down to 120/208 volts for the lighting panelboards. The saving in wiring cost over the use of lower-voltage feeders has ranged from 17 to 20% on other jobs.

Power for lighting is distributed to the nine floors devoted to public use by a vertical 1,000-amp., 480-volt, 3-phase bus. On every other floor there is a bank of 3-phase, air-cooled, dry-type transformers. The primary is connected delta and the secondary Y to furnish 120/208 volts, four wire, three phase for the lighting panelboards. Power, representing a smaller load, is handled by cable feeders running from the main switchgear in the basement to Westinghouse Pantrol-type group control switchboards. These



Dark ceiling areas were eliminated in general office lighting (left) by use of Corning Glass fresnel lenses. Average intensity is 45 f-c. Staff members' dining room at right received a treatment of cove lighting for pleasing effect

units handle air conditioning equipment, elevators, pumps and other power. A 4,800-volt primary cable feed from the Los Angeles Department of Water & Power enters a basement vault. Three 330-kva. transformers feed the lighting and three 250-kva. transformers, the power. Lighting and power are separately metered.

Lighting Fixtures

Lighting fixtures for the general office areas are hot-cathode fluorescent type. Before selection of a fixture for the general lighting, tests were conducted for 3½ months. Fixtures tested included every type of louver and lens unit available at the time, both surface mounted and recessed types. From these tests, a recessed fixture, using 40-watt lamps with white enamel-backed reflectors and Corning Glass fresnel lenses, was selected. Factors influencing selection of the Corning lens were: it had a minimum amount of surface glare and, because of its design, using four prisms in each edge, the usual contrast of dark and light surfaces on the ceiling was eliminated.

The accompanying photographs of the first and third floors show that shadows have been eliminated. Also the ceiling areas have an even amount of light throughout. The dark and light contrast of the ceiling is eliminated. This is because the four prisms in the side of the lens direct the light across the ceiling between fixtures. Fixtures were manufactured by the Light Control Co. of Los Angeles.

The first floor ceiling height is 14 ft. The continuous rows of fixtures are mounted on 8-ft. centers between columns and 10-ft. centers at the column lines. The general office area is 7,076 sq. ft. The amount of maintained light in this area is 40 f-c. The third floor is typical of the remaining floors, not including 8 and 9. The general office area has 4,536 sq.ft. Ceiling height is 9 ft. Maintained lighting intensity is 45 f-c. The color scheme throughout the building's first seven floors is as follows: verdi-antique green tile-covered floors, light green flat-painted walls with cream-colored ceilings.

Control of lighting represented a problem because of the fact that most of the lighting fixtures are in the gen-

Cove lighting in lounge and library (left) harmonizes with restful interior decorations. Directors' room at right is pin point lighted by four prefocal display lamps. An optical pin-point unit also lights map board at end of the room

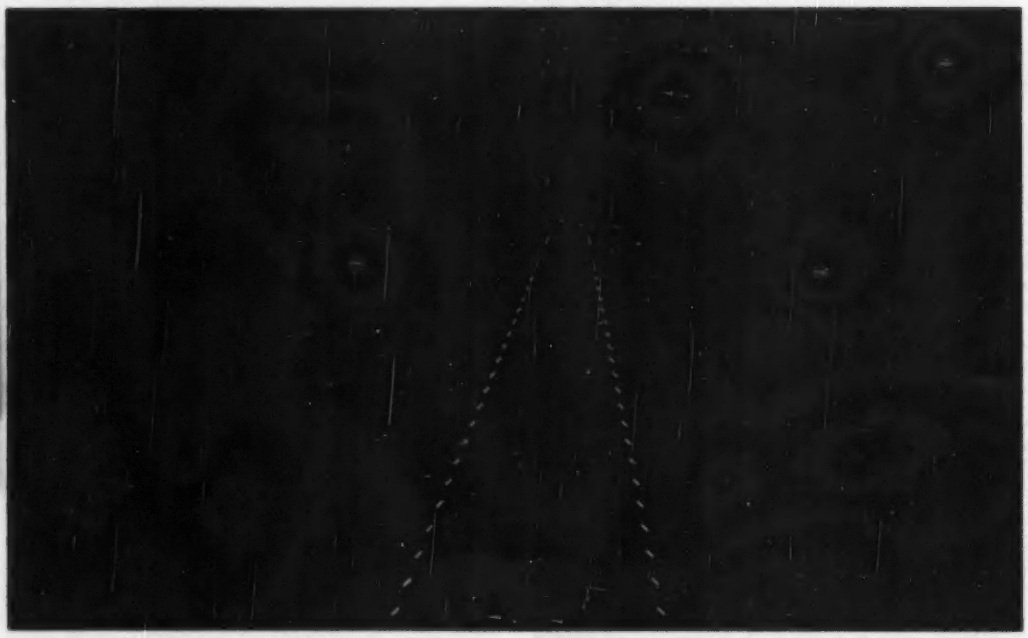
eral office areas and could only be controlled from entrance ways at each end of the building. Space for switch mounting was a factor to consider. There was insufficient room on the partitions for the standard gang type of switches. Also, if space were available, an installation of standard gang units would mar the architectural beauty of the building. To solve this problem a circuit relay system was selected. The system utilizes small unit-type switches and 110-volt relays. With an arrangement of this kind, it was possible to mount six switches in the space normally used by two standard switches. The accompanying drawing shows the schematic wiring for controlling the fluorescent lighting circuits in the general office areas.

Special Lighting

Lobby Mural—Attention is directed to the accompanying photograph of the oil-painted canvas mural. The problem of obtaining an even intensity of light from top to bottom of this large painting was one that could not be met with a standard commercial fixture. The marble recess for the mural was 13 ft. 6 in. high by 12 ft. 11 in. wide. It was necessary to illuminate the mural from the top because the bottom would be used for plants. The maximum mounting distance of a light source from the top of the mural was 24 in. A special Alzak aluminum parabolic-shaped troffer type reflector was fabricated by the Wendel Western Co., Los Angeles. The reflector was recessed into the marble cove. It is equipped with twelve 60-watt silver bowl lamps. Note the even distribution of light over the entire area of the mural.

Directors' Room—This room has mahogany paneled walls and a long mahogany board table that blend in with brown leather chairs. The carpet is green and the draperies are of yellow with bands of gold. Ceiling is acoustic plaster. The design and interior decoration of this room made it possible for special lighting effects. The board table is illuminated by means of pin point units. There are four of these optical units mounted in the ceiling above the table. A 500-watt advertising prefocal display lamp is the source of light. Aperture opening in the ceiling is 1 in. Intensity on the directors' table is 25 f-c maintained. As may be seen from the photograph, the board room table is well illuminated. Also, it will be noted that a map board which is normally concealed behind large doors is also illuminated with an optical pin point unit.

The ninth floor general area is illuminated entirely by cove lighting. Because of the restful interior decorations, as illustrated, cove lighting was selected for the lounge and library adjoining the board room as well as for the staff members' dining room.



High Intensity Lighting Installed at Los Angeles Airport

One of the first high-intensity airport runway lighting systems in the nation was put in operation at Los Angeles International Airport.

Controlled by a new high-speed switching device located in the control tower, the system consists of 60 elevated lights spaced at 200-ft. intervals along each side of the 6,000-ft. runway. The end of the runway is marked by six green threshold lights. The high-intensity light is a directed beam, projecting light only toward approaching aircraft. Output can be varied from a minimum of 100 cp. per unit to 31,000 cp. At full capacity, runway lights produce a total of more than 1,800,000 cp.

Intensity is increased at the control board as required by ceiling and visibility conditions. Primarily installed for night use, the system also provides marking for daytime landings when conditions are poor.

Similar installations are planned for most major air terminals in the United States.

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Too easy

Spring has come and with it a surge of construction activity. Housing and public works, it is, more than commercial and industrial. With it has come the spring budding of demands for higher wages and fringes, such as vacations. San Francisco Electrical Contractors Assn., after virtually acceding to a pay raise disguised as a vacation plan, backed up when Local 6, IBEW, raised the ante.

Fry pan

Meanwhile Billings, Mont., contractors thought they were getting out of a pay raise by granting a 5-day vacation for men who work 2,000 hours this year.

Unfair

IBEW is mad at REA. Wallace Wright, vice-president, told the Idaho inspectors meeting, because REA "discouraged some Montana REAs from collective bargaining to require that work would be performed under IBEW union conditions." Dan Tracy wrote a strong letter of protest.

Counties

San Bernardino County, Calif., now has county inspection, with Barney Alverson as its electrical inspector. Alameda County also recently enacted a county ordinance.

One's enough

Utah's city licensing and examination ordinances were thrown for a loss when a contractor in Orem, arrested and fined for operating without a city license, took his case to the state supreme court and won. The court held that a state license was all that was necessary. This awakened Utah contractors and inspectors to a realization that there is a state licensing law, but it lacks qualifying examination. Instead of working for a state code, efforts will now be made to amend and strengthen the existing law.

Help

Robert A. Peterson has been appointed technical assistant secretary of International Association of Electrical Inspectors, to assist Charles Smith with the News-Bulletin, proceedings and code technical details. He is from Detroit, is an electrical engineer.

Energized copper

Butte, Mont., is experiencing something of a building boom since Anaconda Mining Co. announced its new plan to cave-in mine the lower grade ores in "the hill." Montana Power has put in a new 10,000-kva. sub to supply the Kelly shaft project. St. John Electric is wiring the new hoist equipment. Anaconda is building a big community hospital which Le Sages Inc. is wiring. A new Catholic girls' school, an outdoor theater, much housing is all making a stir in Butte. Even Finlen Hotel is installing some copper fluorescent Sunbeam fixtures sold by Bob McDonough and installed by Reardon Plumbing and Electric.

Join forces

Boise electrical contractors met with Pocatello and northern Idaho contractors during IAEI meeting there and considered formation of an Idaho Chapter of NECA. Several Pocatello contractors belong now to Utah Chapter.

Idaho law

Idaho legislature did not act on any amendments to the Idaho state electrical law. At one time it almost moved to repeal the law. However, a reorganization of all state licensing agencies was made by a special committee. The staff of inspectors under Carl Baldridge is being increased some and public acceptance of inspection was reported increasing. The NE Code is used straight.

Lighting names

Leonard A. Hobbs, manager of Smoot-Holman Co., Los Angeles, and secretary of the RLM Assn., has been nominated a director of IES. He has been chairman of the San Francisco Chapter and active in So. Calif. Section. Carl O. Martin, Benjamin Electric & Mfg. Co., Western manager, was nominated South Pacific regional vice-president to succeed Ted Shepherd, L. A. Dept of Water & Power. Martin headed the committee on cannery lighting standards, whose report was just published.

Learn to earn

Square D Co. closed its competition for undergraduate students of engineering in Western colleges April 15. Theme was "Small air circuit breakers." A cash prize of $150 is to be awarded the winner in Los Angeles.

Light clinics

Both in Utah and Idaho the General Electric Lighting Clinic will be shown to a comprehensive group of audiences, sponsored by Utah Power & Light Co. and Idaho Power Co. The Utah showings will be in Salt Lake City and those in Idaho both in Boise and Pocatello. Each showing starts with a preview for the trade, followed by a school lighting, an office lighting, a store lighting, a retail trade residential preview and a home lighting and finally an industrial program. Twenty manufacturers of lighting fixtures will participate to make the clinics virtually a local exposition. The G-E Lamp Dept. troupe will present stage shows, motion pictures, displays and lectures. Contractors are asked to bring their customers as well as their staff and associates.

Five awards West

Winners of awards in G-E's nation-wide Planned Lighting contest numbered many Westerners. Announced at the EEI sales conference last month were these winners—Arne Rintala, WWP., Spokane; George Wellman, PG and E, Chico; Othmar W. Sailer, C. F. Braun Co., Arcadia; William A. Lowry, WWP., Spokane; C. L. Daly and C. M. J. Wood, PG and E, San Francisco. Each had a group of co-winners who will be announced when winning pictures are shown in Electrical West.

T-H case

Mrs. Selvin's case before NLRB to break the closed shop agreement between Los Angeles Chapter, NECA, and the union was turned down by NLRB because she herself was not a party in the issue. She declared she would appeal to the national board.

Claims biggest

Largest chapter of NECA in the U. S. is what Los Angeles Chapter now claims, having passed San Francisco in membership. It had 111 members at the beginning of April. The chapter now is clearing members unemployment claims through its office as an aid to reduction of unjustified claims; hence reducing fees. . . . The chapter recently was visited by a Japanese electrical delegation.

Experience counts

Preparations for the annual convention of NECA in Los Angeles, beginning Oct. 17, are well in hand. A. L. Stone, treasurer of the Los Angeles Chapter, who handled the 1938 convention there so successfully, has all preliminary details already well planned. However, local committees were concerned over the NECA administrative committee's appointment of a remote convention committee, headed by A. Lincoln Bush of New York.

IES prepares too

IES national president Charles H. Goddard, Sylvania Electric Products Co., New York, set the stage for the August 21-25 National Technical Conference of IES in Pasadena during his visit West last month. He conferred with officers of chapters and sections and convention committees. Preliminary schedule indicates a general technical session, a session on light sources, one on residential lighting, another street lighting, a second and third general meeting and an aviation lighting session. Two California men would contribute to the latter program, all other papers being from Eastern experts.

Pilot unit

A pilot light with a flush neon lamp built into it is announced by Pass & Seymour Inc., as an addition to its Modular Despard line. Long life, without heat is the feature.

Sun and light

Ruby-Phillte has announced a complete new catalog of its slimline and fluorescent fixtures. It includes fluorescent squares and incandescent Display-o-lites. One unusual fixture on which data are given is a combined fluorescent and sunlamp unit.

Water pressure

Electric water systems are coming in for promotional effort by the National Assn. of Domestic & Farm Pump Mfgrs., which has prepared a cartoon broadside, streamers, display cards and a merchandising tip sheet. All of it is to make more business for dealers.

Pepper upper

The Stimu-Light-Or is a new publication of Westinghouse Lighting Division, designed to stimulate sales effort in lighting. Contains many usable ideas for salesmen and contractors.

Tape robot

Slides and sound are synchronized ingeniously on a magnetic recording tape by McBride Engineering Co. of San Diego, by using spots on the tape to activate relays that operate on an automatic projector and give a sound track independently at the same time. It can be adapted also to start and stop other mechanisms.

Flaw finder

Black light and fluorescent magnetic powder are now used to detect tiny cracks in metal parts by a combination of the talents of Switzer Bros., the Glo-Craft developers and Magnaflux Corp.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 67

SUBJECT: Radiant Heating for Counter Top
CUSTOMER: B. C. Motor Transportation Ltd., Larwill Park Depot
TYPE OF BUSINESS: Motor Transportation
SERVICE COMPANY: B. C. Electric Co. Ltd.
DATA PREPARED BY: R. W. Racine, illuminating engineer, B. C. Electric

Glass counter top is kept warm with soil heating cable placed beneath counter

Supplementary head provided by soil heating cable proved solution to the problem of warming the glass top of a travel bureau counter. The glass top became oppressively cold in winter because of its proximity to the main entrance doors. Employees selling tickets and giving travel information suffered swollen fingers and cracked skin from contact with the cold glass. Besides, the glass top induced a chill to employees, probably because it increased the heat loss from their fingers. Nevertheless, the glass top was considered essential as it provided an orderly and neat means of displaying maps and schedules. The soil heating cable was found to be the most advantageous heat source since the heat could be concentrated where needed. The heat could be controlled and the cable inconspicuously placed.

Installation

A soil heating cable of the C.G.E. type was laid flat on an asbestos sheet covering a false bottom in the counter. The cable was fastened securely to notched wooden headers nailed to the false bottom. The 1¼-in. deep cavity was then filled with fine dry sand to store the heat and distribute it evenly over the whole surface. This eliminated the insulating qualities of any dead air surrounding the cable. The sand was covered by a 3-ply veneer board and a green beige cloth. The travel maps and schedules were laid on top the beige and held in place by a ¼-in. thick plate glass. The cable was fed from a lighting panelboard through a single-pole toggle switch located underneath the counter. Temperature control was by a thermostat whose thermal element was buried in the sand. In addition a ruby pilot light was installed on top of the counter to indicate clearly when the switch was turned on.

Design data were: Counter dimensions, 9 ft. x 1½ ft. (13.5 sq. ft.); wattage per counter, 400 watts (excluding 7 watts for ruby light); cable spacing, 3 in.; wattage per square foot of counter top area, 29.6 watts. Total cost of the installation was $79.19.

Operation and Performance

When the air temperature in the building is around 60°, the cable is switched on day and night, and the thermostat is set at 115°. When the air temperature is 73°, the thermostat is set at 100° and the cable is switched on in the early morning, in the rush hours and at night. This eliminates the chilling effect of the glass top and the draft through the entrance doors. It also has stopped the swelling and cracking of hands.

Energy consumption with an air temperature of 60° is 260 kwh. per month. With an air temperature of 73° consumption is from 100 to 120 kwh. per month. Estimated load factors are respectively 85% and 40%. The latter is figured on the basis of 50-minute cycles, 35 minutes on and 15 minutes off.

This supplementary heating is so effective in increasing employee comfort that the company has added counter top heating to the plans for all the counters in their proposed new depots.

ELECTRICAL WEST

Too Much Paternalism?

MORE and more demands are being made that employers give the high-wage, intermittent employment trades all of the plus social group compensations enjoyed by lower salaried groups as concomitants for their lower wage but steadier employment. By this is meant the vacation with pay, the pension, health plans, paid holidays, credit unions and even picnics which employees of large companies often receive in addition to their pay.

Now such workers as the electricians in the building trades want the same, forgetting that their high wage rate was predicated on intermittent employment and lack of these other social niceties. In the first place it is very complicated for a number of small and competing employers to arrange any way to pay for such things. The added overhead needed to account for these benefits takes more than the employee gets out of every dollar for such fringes. And the public won't pay for so much fringe and so little work. When the public won't pay, there's no job and no wages.

Why be so greedy? The electrician's wage scale is already almost double that of the factory worker. To add more benefits as hidden wages is to load the public beyond the back-breaking point. Where is the old self-reliance of the man who chose to be an electrician, with its risks of slack employment, but its greater independence and better pay? Has he gone soft, that he needs the coddling of paternalism to shield him from the risks of life? Or has his union leadership run out of sales talk to keep him a member to the degree that it must keep promising him more and more cake?

Playing With Natural Forces

HOW much further can man monkey with nature before the forces he looses will destroy him? Ever since the first atom bomb was dropped, this question has been uppermost in the minds of many people. We pose it again because of the increasing interest in artificial rain-making, a field in which man is again playing with natural forces of destructive power.

Two recent items have pointed up the question. California Electric Power reports on the results of successful rain-making operations in one Sierra watershed. Salt River Valley Water Users' Association has signed a contract with an Arizona rain-making organization to produce additional rainfall in the area drained by the Salt River. And New York City, having been set to try cloud seeding, found that nature, after a long drouth, produced bountifully over its reservoir area. If man can turn the heavens off and on at will, he may have solved the water problem of the semi-arid Far West. But if, in the turning on, he sets in motion forces he cannot control, then come the floods. Some 33 years ago an unsuccessful $1,000,000 suit was filed against the City of San Diego for alleged floods brought on by a rainmaker named Hatfield. Everyone hopes that the present efforts to produce two snowflakes or two raindrops where one fell before will not have that sort of an ending.

New Wiring Challenge

"HERESY" some electrical people are going to say when they read the proposals in this issue of both an architect and an engineer that the industry forget tradition and strike out boldly in search of new and better wiring methods. But they should remember that it was the so-called heretics of the Middle Ages and the Renaissance that put the world on the road to modern culture and civilization.

Certainly everyone will admit that home wiring fails miserably in assuring the housewife of the efficiency and conveniences that the myriads of new electrical servants promise. The same holds true in commercial buildings. It is only in industry that real progress in electrical flexibility had been made.

So before condemning the revolutionary suggestions of Engineer A. B. Smedley, critics of any new approach to this vital problem should ponder these words of Architect Walter R. Hagedohm:

"Crystal ball-gazing can bring to view Buck Rogers innovations. There is much room for junior Edisons. Codes of course will bring stumbling blocks. Selfish interests will not be amenable. However, if electrical usage is to develop fully in the future, the following must

EDITORIAL VIEWS

be brought about: Greater simplicity and simplification in fixtures, fittings and transmission. More beauty in design considerations. New methods of distribution mains throughout individual buildings with radionic or electronic control and with selectivity as in radio and television."

So with the stimulation occasioned by the architect's critique and the engineer's new approach, the challenge is tossed to the industry's youthful Buck Rogers and Junior Edisons. May they come up with something new and better.

Financial Hokus-Pokus

IF a business enterprise used the statistical and accounting techniques of various government agencies in seeking funds for development and expansion, its entrepreneurs would find themselves sudden "guests" of the government in some state or federal penitentiary. We make this statement after trying to comprehend the devious means by which the USBR gave the Kings River development in the San Joaquin Valley a benefit-cost ratio of 1.6 to 1.0. These benefit-cost ratios are the bait on the hook offered Congress when appropriations are sought for any and all projects. Only in the case of the Kings River program the USBR presented the figures in its effort to induce the Federal Power Commission to revoke a power license granted Pacific Gas and Electric Co. and reserve it for the bureau. Incidentally, the bureau does not have either Congressional authorization or appropriations for the Kings River project.

The USBR sets total power benefits from the project at $5,228,000, consisting of power revenues of $2,850,000 and indirect benefits of $2,378,000. Against this it sets costs at a figure of $3,246,000. Hence the 1.6 to 1.0 ratio. Commenting on this feat of legerdemain, the California State Engineer's report says "the figure of $2,378,000 as stated in the report under review, represents 'indirect tangible benefits' resulting from the distribution and final utilization of the electric energy produced by the proposed development. These claimed 'indirect tangible' benefits are classified in the report as 'saving,' 'extended,' and 'utilization' benefits. Since there are no practical methods or means of collecting these indirect benefits and statutory authority for same, only the direct benefits, the power revenues can and should be considered in a realistic analysis of the financial feasibility of the development."

If the FPC and Congress apply to the USBR Kings River project, the same kind of yardsticks used by the SEC in weighing the validity of a corporate request for permission to sell securities, the bureau will get no license and no money.

You Can Say That Again

NOBODY in this world is more secure than a man in a penitentiary. He is fed, clothed and housed. But he is not free to go and come as he pleases. He is watched, guarded and disciplined. There are millions of people in other lands who have that kind of security. But we Americans have always believed that the only real security lies in liberty and opportunity.—Harvey S. Firestone Jr., president, Firestone Tire & Rubber Company.

WHAT government bureau would have picked Henry Ford—the power house helper—to pioneer the making of low-priced cars? How would Washington planners have been able to pick the Edisons, the Ketterings 25 years hence? You can't delegate inspiration or far-flung vision. Scientific, creative talent of high order can't be produced by bureaucratic edict or by any formalized procedure. Give initiative free play and the creative mind will discover itself. Natural selection will sift the geniuses from among the 140,000,000 people. That's how we got the Eli Whitneys, Goodyears, Mergenthalers, Burbanks, Elias Howes, Samuel Morses, the Wright brothers. Nobody selected them. With free opportunity, they selected themselves and forged ahead of their rivals.—Nathan W. Shefferman, executive director, Labor Relations Associates.

RMEL President W. D. Johnston, Mountain States Power; Anaconda's Albert Tracy, AW Bureau chairman

L. M. Robertson heads the RMEL Engineering Section and H. T. Rankin directs the Sales and Promotion Section

RMEL Talks Over Problems

Varied phases of the industry given thorough study

WHAT to do about Denver's no-television dilemma? What economies can be devised to improve and at the same time cut the costs of providing electric service? How to build domestic lighting to the same high standards of Denver's schools and streets? These questions are typical of the variety of problems given a thorough going-over at the annual spring conference of the RMEL at Denver March 26-28. More than 275 electrical people from all of the Rocky Mountain states attended.

Dealers within a 50-mile radius have formed a Committee for Television for Denver. Purpose is to circulate petitions addressed to the FCC seeking to expedite hearings on the seven television applications pending for the five channels assigned to that community, Denver, it was pointed out, is the only metropolitan community without television broadcasting. There is a television blackout from Omaha to Salt Lake and Albuquerque to the Canadian line. Hugh B. Terry, manager of KLZ, Denver, inferred that the freeze may not be lifted until late 1951 and that another year would pass before a station might be operating.

Denver dealers, according to Mel Collier Music Co., are not satisfied with this timing and propose, if possible to do something about it.

Power companies in the region, said John E. Loiseau, president, Public Service Co. of Colorado, are breaking their backs to make an 80% operating ratio. Expenses are going up faster than gross revenues; hence better and less expensive ways of providing service must be found by operating men and new sources of revenue developed by sales departments. Loiseau questioned whether Congress meant that the so-called "preference clause" in the Reclamation Act granting public agencies prior rights to government power was meant by Congress to be used as a tool to socialize the electric light and power industry. He also insisted that the resale clause demanded by the USBR, the Bonneville Power Administration and other government power distributing agencies represented a usurpation of states rights by imposing dual regulation on the utilities.

Engineering Sessions

Operating men were especially concerned with plant design and the application of automatic controls to insure both efficiency and economy. A. A. Woodward, Public Service Co. of Colorado, stressed the relationship between average cost of fuel and projected load and load factor in steam plant design, pointing out that load factors in the Rocky Mountain area do not encourage the use of reheat cycles. Boiler selection must be coordinated with long-range availability of a particular fuel, J. Y. Parce, Stearns-Rogers Co., said.

Simple and reliable automatic control for steam generating equipment, available at costs ranging from $1.50 to $3.50 per kw. of installed capacity, will offset rising fuel and labor costs, according to G. M. Wallace, Bailey Meter Co. Higher labor costs and lower prices for turbogenerators afforded by standardization make the choice of larger units desirable, M. M. Koch, Public Service Co. of Colorado, told the group.

Four panel discussions were devoted to distribution economics. Tap-changing transformers, because of lower first cost and cheaper installation, are to be desired over a transformer-regulator combination according to L. P. Langdon, Southern California Edison Co. J. F. Fuller, General Electric Co., pointed out that a single-pole recloser is not adequate for the protection of motors served from a 13-kv. ungrounded Y/delta secondary. Forty motors were recently burned up in a Wyoming oilfield when such a line singled-phased, he said. Manufacturers should standardize on three-heater protection in the motor starter in his opinion.

For important circuits where continuity is vital, a loop rather than a radial feeder is standard with Home Gas and Electric Co. said Paul Jones.

A plea for the adoption of EEI standards for crossarms and poleline hardware was voiced by M. H. Powell, Public Service Co. of Colorado. Practical and immediate savings would result, he said, because manufacturers might cut down on special items. J. E. Wilson, Colorado Central Power Co., Frank Howard, Mountain States Power Co., and Fred Wiley, City of Colorado Springs, all led panel discussions.

Adequate Wiring

Apparently there will always be an adequate wiring problem as long as electrical people meet, Albert Tracy, Anaconda Wire & Cable Co., told one session. Selling by the whole industry whenever and wherever is the one panacea, he said. A. F. Zito, Arrow Electric Co., reported how Denver contractors are working with home builders. He urged industry help in winning

over both the architects and the home builders to greater wiring adequacy. Simon Halle of NECA emphasized the importance of the apprentice training program sponsored by electrical contractors in the area.

Sales and Promotion

In addition to the television freeze, Rocky Mountain dealers are concerned over increasingly loose credit terms for appliances, such as "no down payment" and up to 36 months to pay on extended contract. Such trends can wreck small and medium-sized dealers, Sam J. Neely, North Denver Furniture Co., insisted. He decried also the selfishness, discourtesy, lack of interest and lack of loyalty of the average appliance sales person.

L. B. Bundy, General Electric Co., reported that the RMEL was initiating a program of distribution of advance national advertising schedules of appliance manufacturers so that dealers might better tie-in local promotion. These will be issued quarterly.

As a result of five years of sales effort, Denver has achieved the reputation of having the best lighted streets in the U. S., Charles O. Woodworth, Public Service Co. of Colorado, reported. Also a survey and street lighting plan is now resting on the desk of the mayor of virtually every city in Colorado, he said.

Gaylord Buck, vice-president, Public Service Co. of Colorado, announced that complete plans for a state-wide sales effort on home lighting will be ready Sept. 1. A mass sales program on certified home lighting is being perfected.

Accounting

Two sessions were devoted to accounting and personnel problems under the leadership of William J. Quinn, Cheyenne Light, Fuel & Power Co.

Pot and Kettle Clubs

Associated Pot & Kettle Clubs of America have scheduled their annual convention at Feather River Inn from June 21-24. The San Francisco club will act as host for delegates, members and their wives of the other six clubs. Frank Speckman is in charge of reservations.

● Lance Robson, chief inspector for electrical engineering in British Columbia, is the new president of the Electrical Inspectors' Assn. of B. C. He succeeds L. H. Miller, city electrical inspector at Vancouver.

Electrical Code Change Asked

Realizing that today's home is going electric, a resolution asking the code panel for Article 230 to change the National Electrical Code, was passed as a final action at the 15th annual meeting of the Rocky Mountain Chapter, International Association of Electrical Inspectors, March 30-31. It was presided over by A. P. Hall, Fort Morgan, chairman of the chapter, and was attended by 58, of whom more than half were active members. It was the first meeting for two years, last year's meeting having been canceled due to conflicting association dates.

The resolution resulted from a discussion of adequacy requirements in the modern home. It was brought out that the average homeowner buys the house from a speculative builder and that the home is wired according to the minimum of the code. Upon occupancy, the owner usually finds wiring inadequate and cannot bring it up to his requirements without an excessive outlay and great inconvenience. If all of this can be taken care of at the time of the original wiring, the work can be done for, at most, 25% of the cost of making an addition to the wiring after the job is in.

With modern homes adding electric ranges, dishwashers, garbage disposers, automatic washing machines, ironers, dryers, refrigerators and others, the present code minimum requirement nowhere nearly provides sufficient service equipment to handle this, it was said.

Hence the resolution passed at the last day's meeting asked that a minimum service entrance wiring be three No. 4 copper wires, or their equivalent, and that a service equipment be provided with a range circuit and two additional two-pole appliance circuits be written into the code. The resolution is to be passed on to the Western Section at its Detroit meeting in October and to the code panel for Article 230.

After usual business preliminaries and reports the first day's session opened with code discussion. Among the subjects covered were wiring in hazardous locations, length of taps and their size for multiple occupancy buildings where all occupants have individually metered services and the owner pays for the energy at one meter location.

At the first noon luncheon George Tenney, editor, Electrical West, spoke briefly to the group.

Harry Davin, Bussman Fuse Co., followed the noon luncheon with a demonstration of how time delay fuses protect circuits and 3-phase motors against single phasing.

Hospital operating room wiring was then discussed. T. J. Vieau, Crouse-Hinds Co., led the discussion. A point brought out was that rewiring and bringing wiring up to standards in old existing installations was not thoroughly covered in the NFPA pamphlet on the subject. It was also thought that because some anesthetics have the same weight as air or are lighter, and are explosive, the whole operating room area should be considered as a hazardous one.

Friday morning's session began with a discussion of adequate wiring. It was then that the inadequacy of present service equipment for homes was discussed.

Another topic of that session was the Type S fuse. It was decided that no recommendations be made until after the investigation of circuit protection has been completed.

At the end of the meeting nominations and election placed the following in office for the ensuing year: chairman, Clifford Carpenter, Fort Collins; first vice-chairman, C. H. Anderson, Grand Junction; second vice-chairman, A. H. Colby, Boulder; secretary-treasurer, V. C. Moulton, Denver. On the executive committee the above officers and the following were named: A. P. Hall, Fort Morgan; C. E. Simon, Denver; D. J. Goodhue, La Junta; Grant Mulkins, Fort Morgan; V. E. Estep, Limon; H. L. Davin, Denver; Ed Heintze, Denver; E. J. Strohminger, Denver; A. F. Weers, Denver; Tom Mackay, Colorado Springs.

Also recommended was that the meeting next year be held during the second or third week of April in order to fit better with the other Rocky Mountain region chapter meetings.

IRE

Advances in electronic and radio services in the West will be keynoted in the forthcoming Institute of Radio Engineers West Coast Convention, Sept. 13-15, at the municipal auditorium in Long Beach, Calif. An extensive program will be combined with the sixth annual exhibit of the West Coast Electrenic Manufacturers Assn.

British Columbia

Murray Harris has been re-elected president of the Lower Fraser Valley Electrical Assn. James Anderson was named secretary-treasurer. The organization held its annual meeting at Cloverdale, B. C., recently.

Spowart Northrop

Ward Raver

Public Power Group Meets

Public Relations was theme of meeting of Northwest Public Power Association held in Spokane

A growing realization that public power agencies have just as much of a public relations problem as any private enterprise was evident throughout the three-day, well-attended (300) sessions of the Northwest Public Power Assn. at its mid-year meeting held in Spokane, April 17-19. P. C. Spowart, Seattle City Light, general program chairman, has been a leader in this thought. Importance of good public relations was probably best expressed by V. B. Jones, Tacoma, who warned that regulation is coming if public power agencies do not develop and prosecute an effective public and employee good will program. Various aspects of public and employee relations were dealt with in a panel discussion led by Spowart, and in papers by James Cantlen, Pacific Telephone & Telegraph, and Harold E. Leffel, Kinman Business University.

Electric house heating was the subject of a panel discussion led by J. Frank Ward, Tacoma City Light. Highlights of the discussion were: Smothers, Grant County PUD, has $59.50 left to amortize cost of serving space heating after paying power bill; Hittle, Cowlitz County PUD, thinks under his load conditions he is justified in serving space heating at present low rates; Spowart, Seattle, said a survey showed a revenue of only $15.02 per kw-year for space heating on the old rate and posed the question, "How can you serve this load when Bonneville energy even at 100% load factor costs you $17.50 per kw-year and it costs you $16 per kw-year to get it to the retail customer?"; McGuire, McMinnville, "We should consider how it affects the region, let's not sell power for house heating and close the door on industry"; Ward, Tacoma, "There are about one million domestic customers served from the Northwest Power Pool. With 10% saturation of house heating at a demand of 3 kw. the load would amount to 300,000 kw.—where is the power coming from? Thought must be given to conservation"; Dixon, Cathlamet, "Unfavorable public relations will be created if industrial unemployment results during the power shortage because of house heating."

An important step to obtain more information on the cost of house heating was announced by Ward. C. T. Hurd, former Cowlitz PUD manager, has been employed by the Utilities Conference Committee to conduct an eight-month survey of the whole controversial subject.

"We must have an organized river development program and keep it on schedule if we are to get out of this power crisis," said Paul J. Raver, administrator, Bonneville Power Administration. Power demands of the region will require expenditure of 200 to 250 millions a year for the next ten years, he said. Private and public power of the Northwest have carved out an area of agreement in the development of power and there ought to be an area of agreement in this fish versus power fight so that the essential features of the power program can go ahead, declared Raver. He said that removal of the Ice Harbor development from "schedule" was a serious matter and urged that everything possible be done to get the project under way. (Later, the association passed a resolution asking Congress to put Ice Harbor back on "schedule.") In speaking of the tight power situation, Raver concluded by saying, "better be reasonable about house heating."

Engineering and Operation

Discussion panels occupied the entire first day of the meeting. A splendid program had been arranged by Owen Hurd, Benton County PUD chairman. Some of the highlights of these discussions follow—E. G. Rash—"Legislative action is needed to give REAs some status on state highways—as a public agency we should have some rights." R. J. Pangborn—"Correction of poor voltage conditions is second only to continuity of service in maintaining good public relations." John Nelson—"Maintaining good appearance of our substations is a responsibility to the community." G. S. Vergeer—"Prompt response to trouble calls is most important." Emmet Clouse—Feels it is an obligation to become a more active agent in the community. K. L. Howe, Westinghouse—"It is logical to supply the customers' reactive needs. Why not meter on a kva. basis?" Vivan Jones—"Don't overstaff—it looks bad. Watch appearance of poles, service wires. Employee morale is neglected by public agencies; we must all cooperate in the power shortage, if we

O. W. Hurd Jones

Billow Johnson

do not we may lose our preference clause." Larry Bauer—"Sectionalizing of secondaries with coordinated fuses will eliminate most transformer secondary banking troubles." J. S. Howard—"The association should use its influence to have the National Electric Safety Code adopted in toto in the State of Washington." W. K. Billow—Gave step-by-step method by which he reduced his distribution losses by 10% in one year. John Nelson—Analysed system losses and advised more study be given to reducing losses. George Burns—Presented tables showing losses on the BPA system.

In discussing the economics of distribution system improvements, O. B. Falls Jr., General Electric Co., said among other things: "The best way to reduce losses is to do adequate system planning; selection of proper subtransmission voltage is important; design substations so that they can readily be expanded; look into the future and choose adequate size breakers; use common neutral to effect economies; study carrier control or other means to control system peaks and save on your power bill; system planning should go all the way from generation to the customer; seek the cooperation of your power supplier in your distribution system planning."

Questions and Answers

A most worth-while panel on questions and answers concluded the meeting. This was conducted by P. C. Spowart, Seattle, with Fred Northrup, Eugene, and Lewis K. Ambrose, Ellensburg, on the panel. Questions of storm and outage liability, social security, agency collection, the problem of detecting bootleg space heating, adding taxes to bills, and other problems were discussed during this panel.

At the business meeting, F. Fred Northrup was re-elected president, John R. King, treasurer, and Gus Norwood, executive - secretary. John George, Clearwater, was newly elected vice-president. Decision was reached to hold the summer meeting of the association in Portland at the Portland Hotel, Sept. 13, 14, and 15. Missoula is under consideration for next year's spring meeting of the Public Power group.

EMA

Annual meeting of the directing board of West Coast Electronic Manufacturers Assn. was held at San Francisco in April to elect 1950-51 officers. Elected were: H. P. Balderson, sales manager, transformer division, Thermador Electrical Mfg. Co., Los Angeles, as president; Orrin H. Brown, works manager, Eitel-McCullough Inc., San Bruno, vice-president; Fred W. Falck Jr., general manager, Advance Electric & Relay Co., Burbank, treasurer; Noel E. Porter, works manager, Hewlett-Packard Co., Palo Alto, secretary.

Preliminary report was made on the 6th annual Pacific Electronic Exhibit to be held at Long Beach, Sept. 13-15.

NAED

National Association of Electrical Distributors has scheduled its next annual convention for June 12-16 at the Convention Hall in Atlantic City.

Sales of dishwashers, disposers, freezers, clothes dryers and air conditioning units will be stimulated with the National Association of Electrical Distributors' new appliance division program. Various committees' activities will be built around a "creed" of basic objectives.

NCEB

Northern California Electrical Bureau's new president is W. J. Lee of Sherman Clay & Co. Vice-president is C. R. Matthews; secretary, O. R. Doerr; treasurer, Frank K. Runyan; and chairman of the executive committee, John S. C. Ross. . . . The bureau's 1950 promotional plans will include appliance campaigns, support of better lighting and adequate wiring programs and increased radio interference work, says LeRoy H. Bennett, manager. "Electrical Wonderland" is the name chosen for a big exposition in San Francisco in late September.

IAEL

International Association of Electrical Leagues plans to hold its 15th annual conference at the Copley Plaza Hotel in Boston from Oct. 11-14, 1950.

Electric Clubs

Electric Club of San Diego had Philip M. Klauber, assistant to the president, Solar Aircraft Corp., as guest speaker on a recent program. Klauber recounted his impressions of Europe, with personal observations on gas turbine developments. Ray Cavell was chairman.

Electric Club of Victoria, B. C., has elected Kenneth Reid as its new president, succeeding George Brisco. Other officers are Robert Patrick, secretary; Allan Jensen, treasurer; Robert Murphy, Arthur Fields, Fred Dulley, Ernest Emery, Hugo Allen and Gerry Mostyn, directors.

IES speakers and wives included Henry Huber, standing; Eric Ackland, vice-president, North Pacific region;

Charles Goddard, national president. At right, K. E. Hollingsworth, B. A. Travis and J. Daniel Webster

IES Notables Talk on Light

To brief you on the major points made by lighting authorities at the recent Northwest Regional Conference of IES in Seattle, we give you these succinct notes and quotes:

General Session

Charles Goddard, national president, IES, also manager of utility sales, Sylvania: "It's the illuminating engineer's responsibility to see that the public gets what it needs in lighting, not just what it thinks it wants or what you want to get rid of. Your mission is to see that the world is lighted properly."

At least 85% of the lighting in the average American city is inadequate. Average home needs four times more light than it now has, classroom seven times, offices five times, factories four times more lighting than now provided.

Goddard referred to IES Standards used today, particularly in Seattle area. Example: state of Washington had adopted as safety standards the IES recommendations for industrial lighting; schools require lighting to be in accordance with IES recommendations.

Store Lighting—C. M. Cutler, General Electric Lamp department, Nela Park: Showed slides of various types of store lighting; steps in applying different classes of light to the job. Stressed use of new colors in fluorescent lighting, use of incandescent and fluorescent intermixed for store lighting.

Color and Light Sources—Robert Bardsley, Sylvania: Discussed use of color in lighting; traced development of the different phosphors to give this color. Was suggested that the lamp companies get together and bring out color that can be easily designated.

Lighting in Architecture—Waldo B. Christenson, president of Washington Institute of Arhitects: Unable to attend, due to illness. Sent telegram urging continued cooperation by lighting engineers, builders and architects.

Visibility Problems—Arthur A. Eastman, General Electric Lamp department, Nela Park: Presented paper on Luckiesh-Moss visibility meter. Felt that meter had not been entirely understood by lighting engineers, and has therefore developed a talk explaining its operation. Meter has been improved since its first issue and is now easier to use. Visibility meter determines number of foot-candles necessary to do a definite seeing task.

Tour—University of Washington—Lyman Morgan, who designed lighting in new buildings, helped conduct tour. Some criticism of type of lighting used (incandescent). Good ideas brought out.

Panel Discussions

Outdoor Flood and Recreational Lighting—R. J. Swackhamer, General Electric: Recreation, to be of value, must be extended into evening hours. Public has demanded that fields be lighted for their use. Discussed lighting of major league baseball parks. Showed slides of good outdoor lighting installations.

Office Lighting—T. W. Fitch, Portland: Members of Building Managers Assn. attended discussion and disagreed with IES recommendations. Was felt that some disagreement due to increased cost to building companies for lighting, some of which they cannot pass on to tenant.

Street and Safety Lighting—Arch Bollong, Seattle traffic engineer: Recently completed tour of eleven Western States, surveyed safety and traffic lighting. Convinced that mercury lighting is best available today.

"Street and traffic lighting is primarily lighting to reduce accidents. Seattle is lighting on this basis. Our records show a tremendous reduction in accident rates in the past ten years and tie in closely with the criminal record as well. Crimes and accidents can be greatly reduced with proper lighting."

Use of Fluorescent Lighting for Street Lighting discussed. Particularly effective in tunnels where lamps can be placed low and brightness good enough for comfortable seeing. Ideal because of low ceiling heights and absence of glare.

Residential Lighting—Harry C. Lynde, Seattle: Used hypothetical house sketched on blackboard and lighted it from sidewalks through various rooms. Brought out importance of color in lighting comfortable home. General lighting in home should be in the low level, augmented by high lighting effects when desirable.

Industrial Lighting—Discussion led by Henry Huber, Seattle. Vapor-proof and explosion-proof equipment discussed; special requirements of paint and spray booths explored.

Ultraviolet Applications—Discussed by Fred Cooper, Westinghouse, Seattle.

Airport Lighting—Lloyd E. Harrison, regional airport lighting engineer for CAA, assisted by Bill Levinger, Arcata Air Field.

Banquet—Followed by entertainment and dance at Edmond Meany Hotel. Special feature by Bert Heinz on guitar.

Officers Breakfast—President Goddard reviewed IES activities. Accepted invitation of Inland Empire Chapter, IES, for next conference at Spokane in spring of 1951.

Total attendance—250. Conference chairmen, B. T. Heinz, K. E. Hollingsworth.

Canadian Convention

A full-scale convention with more than 300 delegates from Canada and the United States attending the Canadian Electrical Assn.'s Western spring meeting at Vancouver, B. C., heard A. E. Grauer, B. C. Electric Co., president, warn that the industry now is facing a transition from a time of scarcity to one of surplus, but that the change is not likely to be accompanied by lowered labor costs.

With customers getting choosey, he advocated increased selling and suggested the chief hope for keeping down prices was increased technological efficiency.

E. D. Gray-Donald, Shawinigan Water & Power Co. Ltd., president of the association, told the conference: "Our industry likes to give service with a smile . . . at lowest possible rates," and added that a sound financial position was "absolutely essential" to the electrical industry. "A bankrupt power company is no good to anybody."

The three-day convention included engineering sessions under the chairmanship of A. L. Hough, Shawinigan Water & Power, and J. H. Steede, B. C. Electric engineer; utilization and sales sessions conducted by C. I. Bacon, Cornwall Street Railway, Light & Power Co., and H. N. Walters, BCE general sales manager; and sessions on community and personnel relations, conducted by H. J. Marilees, E. F. Campbell, P. C. Woodward, and L. B. Jack, all of BCE; D. E. Ellis, Shawinigan Water & Power, and K. I. Jack, Washington Water Power Co.

Jack, advertising and publicity manager for WWP, told delegates public opinion surveys were of particular value to utilities because they served the community at large.

At sessions under the chairmanship of Steede, H. R. Rorden, Bonneville Power Administration, discussed minimum designs for 230-kv. transmission lines and possible adaptation of existing high-voltage construction to higher operating voltages. Submarine and overhead river crossings were discussed by F. O. Wollaston and A. Riddle of B. C. Electric.

On the third day the utilization and sales session was held jointly with an annual conference of the B. C. Association of Radio & Appliance Dealers, under Alex Forst, as chairman. Tom Brown, president of the province and Vancouver branches and Alf Food, the Victoria branch, and W. Lockley, Frazer Valley branch, assisted. The morning session heard Howard Walters, president, and R. Hall, secretary, of B. C. Electric Service League tell of the association's value.

Then followed five panel sessions. First was on "What Appliance Dealers Expect From Their Power Co.," with Mel Thomson, chairman, then "What the Power Co. Appliance Manufacturers and Distributors Expect from Retail Dealers," with James Skelton as chairman, and "Profitable Merchandising," under chairman Forst; "Your Future in Television," under Ted Barker; and "Selling a Replacement Market," with Don Coltman as chairman. A representative group appeared on each panel. Howard Emerson, *Electrical Merchandising*, San Francisco, was banquet speaker, talking on "Selling is Our Business."

IAEI

How to handle low roof services, the grounding of clothes dryers, whether a dishwasher should be connected to the 20-amp. kitchen appliance circuit, and the proposal to change the code to rate general lighting circuits at 20 amp., were the subjects that drew the discussion at the Salem meeting of Oregon Chapter, International Association of Electrical Inspectors. O. T. Fugitt, Portland, presided. No agreement seemed to be reached on any of the above subjects which were interpreted differently in local and in the Oregon State codes.

Problems created by the wartime substitute wiring materials in Housing Authority buildings, explosion-proof wiring experience at the Standard Oil refinery, the need but the difficulties for electrical reinspection and hazard abatement and an opinion on interchangeable circuit breaker panels, were main topics at the Northern California Chapter, IAEI, last meeting at Richmond, presided over by B. Wiesinger, San Francisco. Secretary-treasurer M. K. Bliss made a plea for reinspection but difficulties encountered by members in such a program were cited. Carl Wellmans, electrical engineer of Albany, spoke on the wiring problems on Housing Authority buildings and in EI wire reaching the public for reuse. Clifford Wingrove, Standard Oil Co., explained that explosion-proof fixtures were designed to contain the explosion safety, not to be water arc or vapor proof. He gave many practical suggestions on installation and warned that the pressure can pile up preceeding an explosion to absorb the safety factor and the end explosion break the device. A letter from M. Brandon, Underwriters' Laboratories, was read regarding interchangeable breakers, saying that experience so far had been good and there was no reason for change evident.

Southern California Chapter, IAEI, was guest of Southern California Edison Co., at the new Redondo steam plant of that company on March 22. The morning was occupied by a tour of the station and later by talks about the steam plant and the Edison system. Henry Rice, Southern California Edison Co., was host. Speakers were Harry Lott, who described the system and the plant; R. C. McFadden, vice-president, who discussed the need for the entire industry selling, and continuing to sell, the electrical idea against competitive fuels. He asked the support of electrical inspectors in making it as easy as possible for customers to use electrical service. The afternoon session, presided over by Ben Wheater, chairman, Long Beach, was occupied chiefly by discussion of proposed changes to the California State Safety Orders. The Square D Co. invited the organization to meet in its July session at the Square D plant. The next meeting will be May 25 at Long Beach, the Square D visit, July 26. It was recommended that all changes proposed to the Safety Orders also be recommended to the proper committees of the National Electrical Code.

IES

Subjects enough by experts enough to reward anyone with any interest in any phase of lighting, are promised from a preliminary program outlined for the National Technical Conference of the Illuminating Engineering Society, at Huntington Hotel, Pasadena, Aug. 21-25. Space does not permit enumerating in this issue. Watch for later details, since some of the speakers invited have not as yet given firm assurances.

Meanwhile IES President Charles H. Goddard has made a visit to the West. He addressed the Northwest Regional Conference in Seattle, reported elsewhere. Also, Los Angeles Electric Club and a joint meeting of Southern California Section and the Electrical Maintenance Engineers Assn. He also held a number of meetings with IES chapters and section officers throughout the West.

EMEA

Electrical Maintenance Engineers' Assn. of Northern California met on April 20 in San Francisco to hear R. A. Hanson of Pacific Gas and Electris Co. talk on sources, transmission and storage of natural gas. Nomination of officers and directors was held at the meeting.

PANORAMA OF THE PCEA

Edited by A. X. Schilling

Convention At Reno

They're a-plannin' to go Western on us, come convention time in Reno, the shank end of this month. They're a-plannin' to flip us real old-time barbeque chow, along about sundown, on June 1. That's Thursday. And a-following that, there's a-goin' to be a real old-time square dance, with all the gents and gals swinging and sailing around all dressed up in Levis, gingham gowns and other Western trappin's. All this, mind you, podnuh, will be in place of that dude semi-formal banquet and dance that former conventions have had.

This year's convention will come to order at 10 a.m. on Wednesday, May 31, in the Tower Theater, Reno, with addresses of welcome by the Honorable Vail Pittman, governor of Nevada, and the Honorable Francis R. Smith, mayor of Reno. Following a few announcements by Frank Tracy, general convention chairman, PCEA President I. W. Borda will deliver his president's address. He will be followed by K. W. Haagensen, director of public relations, Allis-Chalmers Mfg. Co., Milwaukee, whose topic will be "To Understand People Is the Key to the Success of Your Business and Your Country." The first general session will close with a talk entitled "The Electrical Contractor—Poor Relation or Active Partner," by E. R. Cornish, Pacific Coast director, National Electrical Contractors' Assn. of San Francisco.

The Wednesday luncheon will be held in the Mapes Hotel Skyroom, beginning at 12:15, with Frank Tracy, president of the Sierra Pacific Power Co. presiding. The featured speaker will be Samuel Platt, Reno attorney, who will discuss "The Menace of Creeping Socialism."

Wednesday afternoon will be devoted to section meetings of the various groups.

The Thursday, June 1, general session also will be held in the Tower Theater, beginning at 9 a.m. R. N. Dreiman, PCEA vice-president, will preside over the session, which will consist of a symposium on the subject "Now Is the Time to Sell." Speakers and their topics will be: Tom P. Walker, vice-president, Irving Trust Co., New York, "Sales Will Pay The Way"; George N. Hawley, sales manager, Southern California Edison Co., Los Angeles, "Sell to Survive"; Henry B. Sargent, president, Central Arizona Light & Power Co., Phoenix, "If You Don't Sell, Somebody Else Will"; J. W. Belanger, assistant general manager, Apparatus department, General Electric Co., Schenectady, "Let's All Sell Together."

The Thursday luncheon also will be held in the Skyroom of the Mapes Hotel, starting at 12:15. H. H. Cleland, PCEA past-president, will preside. The luncheon speaker will be Nathaniel Leverone, chairman of the board, Automatic Canteen Co. of America, Chicago, whose topic will be "Freedom and Understanding." Section meetings of various groups will be conducted during the Thursday afternoon parallel sessions.

Late in the afternoon of Thursday, the manufacturers, manufacturers' agents, wholesalers and distributors will be hosts to the delegates, their wives and guests at a cocktail party. Dress for this occasion will be informal, Western preferred. Gingham gowns, Levis and cowboy togs will be the fashion.

Following the cocktail party, an old-time Western barbeque dinner will be served from a chuck-wagon especially arranged for the occasion, and the tantalizing melodies of yesteryear will beckon everyone to enjoy an old-time square dance. Again, Western dress will be the mode.

The final general session, Friday morning, June 2, will be held in the State Building Theater Auditorium, beginning at 9 a.m., with George C. Tenney, PCEA past-president, presiding. The session will open with a dramatic skit entitled "The Lighting Load Is the Mother Lode," with an introduction by F. M. Falge, manager, Pacific Sales District, Lamp department, General Electric Co., San Francisco. The cast of characters will be: James Marshall, played by J. Walter Howard, G-E Lamp department, Los Angeles; first speaker, James Fearnehough, G-E Lamp department, Oakland; second speaker, Sam Hazleton, G-E Lamp department, Oakland; banjo player, Hal W. Goodwin, Reno; and the girl sextet, from the music department, University of Nevada, appearing through the courtesy of H. T. Post, director.

Following the skit, J. A. Hutcheson, vice-president and director of the Research Laboratory, Westinghouse Electric Corp., East Pittsburgh, will speak on "New Frontiers and New Horizons."

The final session will conclude with the association's annual business meeting.

Golfers and spectators will spend Friday afternoon in the annual golf tournament, with competition for the Byllesby Cup, the Pelton Cup, the Addison B. Day Cup, and other valuable prizes.

A special entertainment program for the ladies has been arranged to amuse them during the hours while the convention meetings are in progress. A highlight of the ladies' entertainment will be a trip to nearby Lake Tahoe, with a stop for luncheon and a fashion show at picturesque Cal-Neva. The group will also stop at Carson City and Nevada City to see historic remnants of pioneer days, including the famous Piper Opera House.

Due to Reno's altitude, the evenings are likely to be chilly and ladies are reminded to bring suitable wraps for evening wear.

Alaska Division, NECA

John B. Majerus, secretary-manager of the Puget Sound Chapter, National Electrical Contractors Assn., upon his return from Alaska recently, reported the formation of the Alaska division of the Puget Sound Chapter of NECA, covering electrical contracting firms in Fairbanks and Anchorage. He also reported negotiations completed covering wages and conditions with Locals 1533 and 1547, IBEW, in those cities.

In Lieu of Merchandise

Appliance and electrical service appreciation has been sold by personal contact and attention to customer needs in Washington Water Power's Plus 12 Program.

Has the Washington Water Power Co.'s "in lieu of merchandising" sales program proved out? R. B. McElroy, sales manager, listed its objectives in 1948. (See ELECTRICAL WEST, January 1948, p. 90) as these:

Maintain the personal contact with customers that the former intensive direct merchandising program used to provide.

Keep customers sold on the electrical equipment they own or buy from dealers.

Present a constant benefit story to customers so that they appreciate that a business-managed privately owned utility can serve them best.

Make the relationship between the customer and the company a personal one, not merely institutional.

Keep the nucleus of a trained sales force active against the time when power to sell will be available again and a strong sales promotional program can be re-established through dealer cooperation.

Know intimate details about customer equipment, its age, condition and the saturation, potential market.

Get support from satisfied customers in time of crisis.

Naturally no program is ever perfect, but on the whole McElroy feels that this one has proved successful.

What it is in brief

The residential sales force, 20 in Spokane, 12 in the Empire divisions, are allocated districts for which they are "the company" to the customers of that area. Each customer is called upon at least once each year, in meter book sequence. During such calls the salesman has a definite story of service to tell, based on a 12-point program. These 12 services are available to every customer on request. If the customer wishes, a later call back is made to present the story at a more convenient time. New customers are contacted immediately, made to feel at home, offered assistance with electrical questions or service.

As it has developed, the district representative is called for all sorts of problems. He also obtains easements, overhang permits for signs or wires, tree trimming permits and often is called on for civic work, talks before small groups and similar activities.

Such extra services are separated from the Plus 12 calls in accounting for the salesman's time. High bills and other complaints, rate explanations, credit information are also handled by them. One job on which they have been effective is that of converting customers from an old flat-rate water heating or frozen-rate basis to the regular rates.

Residential sales supervisor, Ernest W. Hatch, summarizes last year's results in these words:

"For the calendar year of 1949 we expended 389 man months on our program. This does not represent all the people in our residential sales section, but from time to time we carry on such other activities as procuring easements, right-of-way, etc. Time spent on these other activities is not chargeable, of course, to our sales program. Resulting from these man months' labor, we made 25,672 calls on our residential customers in meter book sequence. We also made other types of calls, amounting to 29,683. In other words, we made a total of 55,355 customer contacts through our residential program. During this same period of time we showed a total of 102 movies to various groups, and there were 11,791 who saw these movies. We also gave 65 short talks on our company and the free enterprise system during 1949.

"We have made no changes in our basic plan, and do not, at the present time, contemplate making any pronounced changes. We were a bit concerned as to what was going to happen when we made our second series of calls in a given territory. We have found that it requires practically no change in our method of carrying our story to our customers and that our field representatives had even better acceptance on the second call than they had on the first. We have had very marvelous acceptance even on the first call."

For new customers

The customer services section each day sends a copy of every service order memo to the residential sales staff. This permits an immediate call on a new customer. The application form provides some information from which to start, the name, where the newcomer hailed from, etc.

On the call a "newcomer" booklet is left, furnishing service information and offering the Plus 12 call. Three calls are made on a new applicant to find her home where it is a home owner or purchaser, two calls on a tenant. On the last call, if the customer is not in, the salesman leaves his card and a note suggesting that, if he can be of help, he will be glad to oblige. His card contains both the company phone number and the salesman's own residential phone so that he can be called after hours. He becomes "the company" thus to his group of people.

This means localizes the phone calls to the residential section rather than causing a customer to be passed around from one department to another. If the representative is out, the salesman on duty in the office can casually handle the problem or relay it to the representative.

The Plus 12 memo pad, however, is not left unless a presentation of its 12 points is made by the salesman. The idea is to make their value real. These pads are not mere handout pieces. They are made to remind a customer of free services available on request.

How prospects are handled

Naturally some people ask where they can buy an appliance. To keep the Plus 12 program from being commercial in the eyes of customers, Hatch says they are very cautious in handling such cases. A postcard is given the customer and he or she is asked to write on it what appliance they are interested in and to name their own dealer and to sign the card themselves. The sales representatives will mail it, but that is all. His purpose is to tell of the plus values the services each type of appliance will deliver.

A typical report sheet for the month will list from 100 to 250 calls per salesman. These are broken down into classifications. For example one salesman during a month will make 106 assigned (meter book sequence) calls,

31 requested calls, 29 requests for the program story, 32 call backs, 35 new customer calls. Of this 233 total, one may concern lighting help, 141 will be on "electric aids" or appliance benefit information, 10 on cooking, 4 water heating, one refrigeration, kitchen planning 4, customer wiring 17, certified wired homes 0, extensions 0, credit 1, rates 20, conversion of frozen rates 3, high bills 26, other complaints 3, house heating 2. Sometimes there are easements, overhang or tree trim permits. The hours spent other than in sales, those in office work and civic work and mileage are also reported.

Hatch declares that the reports required of the men are simple to make out, the idea being to eliminate office work and keep the men in the field.

Asked how salesmen who once had the satisfaction of closing sales reacted to a program of intangible selling, Hatch says that those who were salesmen and nothing else could make them happy have gone into business as dealers or to work for dealers. But the majority stayed and like their personal contacts with customers and the importance those customers place in their advice.

To keep morale high, refresher meetings are held occasionally in which a light, constructive program is presented and a dinner served. At these the salesmen swap experiences and views much as they used to do at Monday morning sales meetings during merchandising days.

It's not the same as merchandising, but it is keeping the company sold to "the most important people in the world, its customers."

● A HANDSOME BROCHURE has been issued by the Construction Industries Exposition & Home Show of Southern California, setting forth details of space, etc., for the 5th National Construction Industries Exposition & Home Show of Southern California at the Pan-Pacific Auditorium, Los Angeles, June 10-18. One of the stockholder-owners of the show is the National Electrical Contractors Assn., Los Angeles Chapter, and its treasurer is A. L. Stone, a contractor of Los Angeles. Carl F. Kraatz is executive manager.

● ELECTRICAL EQUIPMENT CO. of Arizona has moved to new quarters in Phoenix. Located at First Ave. and Madison, the new building contains more than 20,000 sq. ft. of floor space, including warehouse space, parts and service departments, display room, auditorium for dealer and sales training meetings and sales and general offices. The firm distributes Kelvinator, Zenith and Bendix products. SAM KAHAN is president.

Save Yourself Service Calls

ONE way to lose the profit from the sale of an appliance is in service calls. High wages and car operating costs eat up the profit on unnecessary calls. Hence it is to every dealer's advantage to reduce the number of service calls or eliminate them altogether.

Here are three ideas for saving money by reducing service calls. Two of them are from B. C. Electric Co. dealer bulletin, *The Serviceman*.

1 Uncrate, inspect and test every appliance at the shop before making delivery. The time and labor spent there in the shop saves many expensive calls at the home of the customer to replace or adjust something.

2 Every time a serviceman goes out to a customer's home, says the B.C. Electric bulletin, he has an opportunity to cut down on under-guarantee service calls. By this is meant he can take the opportunity to give the customer pointers about the appliance which will help her avoid future trouble. In this way he saves himself calls.

Let's take, for example, an electric range under guarantee. The customer has complained that the door doesn't fit tightly. After the serviceman has made the necessary adjustment to the door, then he can suggest things the customer may watch out for, which his experience tells him have caused complaints or trouble on this particular appliance before.

It might be such a thing as making sure that the oven elements are pushed all the way "home" after having removed them to clean the oven. Or, it might be to caution her about the automatic timer set lever, to explain that, if it is not returned to "manual" after use the oven won't work. In other words, he should make any suggestion that will help her avoid doing those things which he knows will cause trouble and so save himself calls.

Every serviceman knows what those things are; and when he gets called out on such complaints he is inclined to think the customer a bit of a "dope" for doing them. But don't forget when she was buying her new range her mind was far too full of terms, down payments, trade-ins, etc., to be able to absorb fully what the salesman was trying to tell her about the range. Actually the customer should have a further demonstration after she has had a chance to use the range for awhile, but unfortunately not all firms have this policy and so it falls to the serviceman's lot to do so.

After she has had the range awhile, there will more than likely be questions she will want to ask and it is the answers to those questions that she is most likely to remember. Because of this, every opportunity should be taken to ask the customer if there is anything about the appliance she doesn't understand. If the serviceman can't draw the customer out, he might explain to her about cleaning the range, making sure to caution her against the use of steel wool, or similar metallic materials, which cause shorts when particles get down in the switches, etc. In this way he will help her to think of other things to ask.

What has been written above about the electric range is equally true of other appliances.

To sum up: "Demonstrate and save calls!"

3 "Every time I pay three dollars I make five!" That's what one alert merchant says. He pays his appliance installation men $3 for any installation on which there are no service calls within 90 days. You can see why. He saves $5 or more every time he does not have to send out men and trucks on service complaints. He also gains a happy, satisfied customer.

This idea would help considerably to eliminate cases where appliances have been delivered and not set up properly. For instance, shipping bolts on refrigerators left in; ironers delivered and no oil put into the mechanism and shipping wires left on ironer motors, etc. Quite often this is a result of having appliances delivered by transfer companies who do not understand about such things. But no matter how this happens or who is responsible, can the dealer afford the customer dissatisfaction it creates?

Or the profit-eating cost of extra service calls?

● HOTPOINT dealers in the Inland Empire and home economics seniors from Washington State College attended a Spokane showing of the new Hotpoint line on April 24. Some 120 were invited to the meeting, put on by Hotpoint's district organization. Speakers included D. W. Rennewanz, Seattle, Northwest district manager for Hotpoint; N. A. Hayes, Seattle, Northwest appliance sales manager for Graybar; V. E. McCain, Spokane manager of Graybar; H. C. Korthals, the firm's Spokane appliance sales manager.

ELECTRICAL WEST

Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

May 1950

An easy winter and early spring is starting sales activity in the Mountain States. Even the late coal strike is forgotten since merchandise seems to be flowing in despite that trouble. Only gripe is that radio makers forget that a large part of the country has no television. There's still a good market for radio consoles and combinations.

Forgotten market

Portland lamp makers had a rude awakening in Oregon when state inspector Bill Volbers and other inspectors demanded UL labeled lamps; proved by taking samples from stock that joints weren't soldered, well taped or the cord protected. Even BTL's face was red on some Certified lamps found defective. Everybody promised to reform.

Lamp this

G-E showed dealers its new black-daylight TV sets at the San Francisco Mart, April 17-19. Featured five 16-in. rectangular black tube sets. Also previewed its lowest-priced model, a new 12½-in. tube set. F. Lowell Garrison, radio sales manager for GESCO in San Francisco, was host.

TV preview

Bendix has brought John Kane out from the East to handle the Bendix radio and TV line in the San Francisco area. Kane Co., as factory rep., will have offices at 607 Market St. Paul H. Rice Co., which formerly handled Bendix, will take on another similar line soon. Rice recently introduced the new 8 cu.ft. Orlay freezer in northern California.

Takes over

New managing director of Intermountain Electrical Assn. is E. E. Brazier, who has been manager of General Electric Supply Corp. in Salt Lake City for several years. He replaces Carlos W. Stone, who recently resigned to take on distribution of Deepfreeze products in the Salt Lake and Intermountain areas.

IEA head

Inland Empire Electrical Dealers Assn., Spokane, is holding its spring sales conference May 10. Has made it easy for buyers of appliances to protest excise tax by providing postcards to mail to congressmen.

Attack the tax

J. J. Lukanish Co., San Francisco, has exclusive distributorship for Gibson refrigerators, ranges and home freezers in northern California, says Bill Danison, Western division manager of Gibson.

Named

Ellis Rehn is the new Western advertising and sales promotion manager for Philco, with offices in the Russ Bldg., San Francisco.

In the West

TV catchup. In Los Angeles TV sales are still booming. By April total sales passed the half-million mark. Now reports about one set to each 3.3 families in the area. . . During March San Francisco dealers sold 2,627 sets, 17% above February, bringing the total sales to 43,350. — Half million

TV financing in southern California is no problem. Banking institutions say that loans made for TV sets are practically "blue chip." On rare occasions when TV owners are faced with repossession of their sets, the reaction seems to be, "Take the car, the house or my right arm, but don't touch that TV set." — No risk

C. E. Hooper, who formerly rated radio program popularity by telephone survey, announced that Los Angeles will be the site for a test of Hooperecorder, a TV program testing device. Instrument is attached to the back of TV sets, which when activated by a signal through phone wires, reads the set and sends back a report on the TV channel each set is receiving. Information is printed on tape, compiled in seconds, giving programmers and advertisers their exact share of the viewing audience. Hooper is negotiating with the telephone company for installation in some 500 homes. — TV tap

Vancouver is demanding that the Canadian Broadcasting Corp. set up a TV station at Vancouver. Letter of protest went to CBC saying that Vancouver was being ignored, that CBC was proceeding only with TV stations in Toronto and Montreal. Asked immediate action in providing Vancouver with a station, or letting a private station go in. — TV demand

A home freezer campaign is planned by Rocky Mountain Electrical League and Public Service Co. of Colorado with distributors, dealers and the Denver Post. An essay contest will be used to awaken public interest, beginning June 4 through 17. Special section of the Post will come out June 13. More than 10 freezers, all makes, will be given as prizes. Dealers and salesmen sales meetings are planned. — Freezer drive

Westinghouse appliance division has revamped its sales program in the West to give salesmen closer contact with distributors and more personal service. Instead of operating all men out of San Francisco, they will be located throughout the Pacific Coast district and assigned territorial responsibilities. Has also divided the sales force into two groups, one for major appliances, the other for electric housewares. — Closer contact

More from Westinghouse: Charles L. Painter has been appointed branch manager of the manufacturing and repair department, replacing Harold T. Lax, recently promoted to the Portland sales force. . . H. M. Anderson is the new Southwestern district sales manager of Westinghouse home radio division. His job - to supervise sales and distribution of radio in Texas, Colorado and New Mexico, with headquarters in Dallas. . . Walter P. Schanz, formerly of Seattle, has become service manager for the Pacific Coast district of Westinghouse appliance division, with San Francisco headquarters. He takes the place of James A. Brown, who moved to New York as general sales manager for WESCO nationally. — Changes

Radio Product Sales Inc. of southern California is opening a display room at San Francisco's Merchandise Mart for its Olympic TV line. Jon and Bud Larkin will be the sales reps. — Opening

Hoffman had added another TV model to its line, designed in French Provincial, with 16-in. TV rectangular tube. Retails at $379.50. — Period TV

Making it pay

Dealers in Montana Power areas are to be paid a good bonus for each range, water heater, water system, dryer or freezer sold to farmers outside the cities. Idea is to make it worth while to go out in the country after sales, not wait for them to come in. Company has made a complete list of the customers to which it applies. Begins May 1, runs through July, says D. J. McConicle, general sales manager.

Home magazine

Admiral is starting a new twist in its promotions with a home planning and entertainment magazine to be called "America's Smart Set." Six issues, each 24 pages, will be printed yearly and distributed from Admiral dealers' lists. Editorial content will be illustrated pieces on interior decoration, food receipes, entertainment news, Admiral's sales message in ads and dealer's message on the back cover. . . Admiral has acquired Midwest Mfg. Co., makers of the Kitchen Kraft line. Will continue the line and enlarge the Midwest plant at Galesburg, Ill.

On guard

Guardex is a new device to protect glass coffee makers and facilitate brewing coffee anyplace without spilling or tipping. Unit is made of steel, fits around any standard 8 or 12-cup coffee maker. Made by Guardex Co., Portland, Ore.

Touring air lab.

Vornado's "Air-Test Laboratory" for measuring fan performance made its debut early this year in Detroit; is now booked for dealer exhibits throughout the country. Viewers see a plexi-glass walled room filled with cellophane streamers suspended from the ceiling. Ordinary electric fan is set into action; streamers inside test room show full scope of air stream produced by fan. Then Vornado puts its air circulator to the test. Unit is demountable for easy transportation.

Change freezers

Boyd Distributing Co. has been appointed DeepFreeze distributor out of Denver. Was formerly handled by Appliance Distributors, which had conflicting lines now that DeepFreeze has ranges and refrigerators.

League briefs

Ralph Yambert, as featured speaker at the recent annual membership meeting of Electric League of Los Angeles Inc., gave a general sales talk on current industry problems. Members re-elected Willard Hallman as president for this year. . . Home freezer promotion late last month was the most recent project of the league, with the cooperation of manufacturers, distributors, dealers and the Los Angeles Herald-Express.

Will handle

Western Gas Appliances Inc., Salt Lake City, has become a distributor for Stewart-Warner radio and TV products. The Salt Lake firm has 12 salesmen in Utah, Idaho, Wyoming and Nevada.

Hot on ranges

Electric ranges are in for a big push in northern and central California with Northern California Electrical Bureau's electric range campaign during the entire month of June. Theme will be low cost of operation - "7¢ a day to operate a new electric range." NCEB will furnish display cards, publicity and ad material. Utilities will support with newspaper ads, display space in local offices, special windows. . . NCEB is also busy with plans for its Electrical Wonderland, Sept. 23-Oct. 1, at San Francisco's civic auditorium.

Show head

Eldon H. Sager of Cory Corp. is the committee chairman for the second Western Housewares Show, this year at the Biltmore Hotel, Los Angeles, Aug. 27-30.

Freezer line

Tyler Fixture Corp. is showing its redesigned 1950 line of HARDERFreeze farm and home freezers, with three uprights of 12, 18 and 30-cu. ft. capacity; 12 and 18 cu.ft. chest models.

San Francisco will have a Western Variety Store Merchandise Show, May 21-24, at the Hotel Whitcomb, with displays of lamps, housewares, electrical supplies, pottery, toys, soft goods, etc. Western Merchandise Exhibitors Assn. is putting on the show. — Variety show

Westinghouse is going to town with the catchy hit, "The Laundromat Song," first sung by Dennis Day on his radio program, later recorded by him. Before public release Westinghouse dealers are offering the disc free with a demonstration of the Laundromat. Using advertising and window displays to play it up. Customers can get either sheet music or record. — On the record

Whirlpool Corp. is the new name that has been adopted by the Nineteen Hundred Corp., long-time makers of Whirlpool home laundry equipment. — Shortened name

Hoover's latest Aero-Dyne tank cleaner features a disposable paper bag. Complete with cleaning tools, will retail at $59.95 and the purchaser's old cleaner, or $64.95 without it. Has a gray enamel body with steel ends and plastic maroon handles. — Disposable bag

Western Mart news: C. G. Hamilton is the new rep. in northern California and western Nevada for Marquery Television & Radio Corp. of Los Angeles. . . Levenson & Savasta, northern California distributors for L & N ranges, water heaters and refrigerators, announces that home freezers of 9, 12 and 18 cu.ft. capacities have been added to the line. . . Kassmer & Harrett Dealers Supply Co. is newly appointed distributor for the electric table appliances of Manning-Bowman Co., covering northern California and western Nevada. — Mart news

Leonard Ashbach Co., parent company of Garod Radio Corp., has bought a big interest in the Wilcox-Gay Corp. Will expand the Wilcox-Gay plant to make more TV receivers, recorders and TV cabinets. — Expands

Central Arizona Light & Power and dealers are in the midst of a Spring Style Show of Modern Ranges, both electric and gas. Runs from April 10 to May 31. Offering prizes for a dealers window display contest. — Style show

Admiral has supplemented its TV and radio line with a 16-in. rectangular tube console in modern cabinet design, two portable radios and a new table model radio. — Adds to line

Miss Muriel Kodis, home service adviser of Arizona Edison Co., won a McCalls award for her "Surprise Party" electric cooking promotion. — Award

Hotpoint has a new line of refrigerators, highlighted by Super-Stor models with eight storage zones. Shelves built into the door, larger shelf area, new interior stylings are some of the features. . . Its 1950 automatic clothes washer has a larger top opening and new cabinet design. . . Latest Hotpoint dishwasher-sinks have a high backsplasher with built-in soap compartments and faucet assembly. . . New line of electric water heaters have a dial for selecting temperatures, permit salesmen to demonstrate like a Hotpoint range or dishwasher. — New models

Webster-Chicago has two record-changer units that play all three speeds. Model 100 is a replacement for the changer in radio-phono combinations, retailing at $46.50. Model 551, for plug in to any radio or TV set, sells at $51. — Play all three

There is NO SUCH THING as an "RLM TYPE" Lighting Unit!

Either it is RLM CERTIFIED or it is NOT.
The Only Way To Be Sure Is To

SEE the RLM LABEL!

Looks can be deceiving in lighting units, too! A lighting unit may LOOK like an RLM Unit, it may have a similar outward appearance, contour, shielding angle, etc.—but unless it is made in accordance with RLM Standard Specifications and carries the RLM Label, it is *not* an RLM Lighting Unit. There is no such thing as an "RLM Type" that does not have the label.

Why No "RLM TYPE"? The RLM Label on fluorescent and incandescent lighting units, not only assures the buyer of design and construction that meets certain minimum standards*, but also provides him with a WARRANTY of UNIFORM QUALITY.

Only those products of lighting manufacturers which are *consistently proved* to be of *uniform quality* and meet the published specifications of the Institute are permitted to bear the RLM Label. This uniformity of quality is of exceptional importance to all those who buy, use, specify, recommend or sell lighting equipment. It is essential to uniformly satisfactory lighting equipment performance, that each unit in the system perform with equal efficiency to the other . . . that ballasts function with uniform efficiency . . . that the reflection factor be uniform from unit to unit . . . that the units be of uniformly durable construction with the identical-gauge steel and the same thickness Porcelain Enamel. Such uniformity reduces to a minimum the plague of spotty performance by individual units in a lighting system.

How RLM Checks Uniformity of Quality

According to the RLM testing and inspection procedures, representatives of the Electrical Testing Laboratories periodically visit plants of all RLM member-manufacturers. They take lighting units right off the assembly lines and out of stock for testing and inspection at their laboratories. They may also obtain test samples directly from the distributors' shelves or out of contractors' stocks in order to check Uniform Quality at every level of distribution.

This activity of the RLM Standards Institute, which makes possible the Warranty of Uniform Quality, is not duplicated by any other agency in the lighting industry. That is why there is no such thing as an "RLM Type" Lighting Unit.

FREE SPECIFICATIONS BOOKLET! This up-to-date 36-page booklet tells why it is important to SEE THE RLM LABEL before buying or specifying lighting units. It contains all RLM Specifications, covering vital construction and performance factors that should have major consideration by the buyers and specifiers. It is an indispensable help in the sale of industrial lighting units. For your complimentary copy (or copies), sent without obligation, write:

RLM Standards Institute,
Suite 815, 326 West Madison St., Chicago 6, Illinois.

This Advertisement is published in the Interest of the Entire Lighting Industry by

RLM STANDARDS INSTITUTE
INCORPORATED
The Letters RLM stand for Reflector and Lighting Equipment Manufacturers

*Every RLM Unit Must Conform with Certain Minimum Standards such as these:

Porcelain Enamel Reflectors — all RLM Units must have a specified thickness of Genuine Porcelain Enamel fused to steel. This unsurpassed high-reflection, high-diffusion reflecting surface is the only commercially available finish that cannot deteriorate or corrode. Simple soap-and-water cleaning quickly restores it to original efficiency.

High-Quality Ballasts — RLM Fluorescent Units must be equipped with Certified Ballasts which prevent high-temperature ballast operations, supply proper starting current and maintain proper operating watts to the lamp. Because of their high power factor, present wiring capacity can be utilized most efficiently.

Reflector Design — every RLM Unit must conform with the most accepted principles of Illuminating Engineering. Such design protects the workers' eyes while delivering, not only the most light per dollar, but also the required quality of light for the individual seeing task.

Sound Construction — RLM Units must comply with high fabrication and materials to insure standards of maximum resistance to sag, distortion and breakage.

R-6057

Electric Living Center in one of the Edison offices. Nine such offices will be used by dealers to demonstrate appliances

Edison Hoists "Sales" for '50

TO say that it is "going through 1950 under full sale," the Southern California Edison Co. has broadsided its business development program by sending to all dealers and distributors in its area copies of a 32-page booklet covering the full program of its commercial department. Coincident with this, it is opening Electric Living Centers in its major offices, four of which, Santa Ana, Alhambra, Pomona and Santa Monica, are already in operation. Santa Barbara, Ventura, Huntington Park, Ontario and Visalia have one under construction.

The centers seat from 75 to 150 people. The stage has a complete electric kitchen and laundry. Appliances of different makes are rotated each six months to give all manufacturers a turn. Standard cooking demonstrations and other appliance showings will be made once a week for the public, with special reference to new purchasers of appliances such as ranges, freezers and automatic laundry.

Beside the group demonstrations, the centers are to be made available to all dealers for any demonstration, either for individual customers or for groups. Dealers may also use the center for sales and sales training meetings; distributors may use it to announce new products of lines.

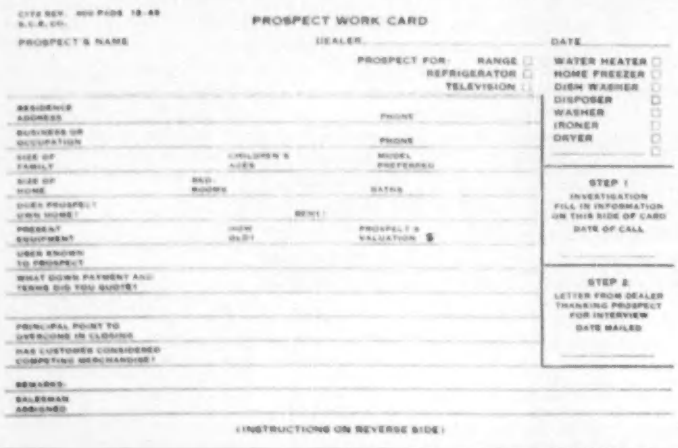
Centers will also be used to present electric living to the high schools of the area. Special demonstrations will be given to homemaking teachers. The home economics staff of the company has been augmented, and Mrs. Pauline Eliker, formerly at Alhambra center, has been appointed director. She will prepare the program and coordinate the work of nine women economists.

The company buys the fixed appliances used, such as the range. This range, after six months use, will be sold to an employee and a new model of another make bought to replace it. The local dealer or distributor will furnish a refrigerator on loan for six months for the advertising value.

The sales program booklet starts by frank admission that the company is lagging in kwh. usage per residential customer. It then calls for a full-scale return to selling by all allies because the company does no direct merchandising itself any more. Then are explained the activities and sales helps the company and its personnel will have to stimulate the market.

Besides the home economists and

Prospect card filled in by the utility contact man and turned over to the dealer. The back of the card shows utility man's follow up of dealer effort



PROSPECT WORK CARD

PROSPECT'S NAME

DEALER

DATE

PROSPECT FOR: RANGE, REFRIGERATOR, TELEVISION

WATER HEATER, HOME FREEZER, DISH WASHER, DISPOSER, WASHER, IRONER, DRYER

RESIDENCE ADDRESS

PHONE

BUSINESS OR OCCUPATION

PHONE

SIZE OF FAMILY

CHILDREN'S AGES

MODEL PREFERRED

SIZE OF HOME

OLD ROOMS

DATES

DOES PROSPECT OWN HOME?

RENT

PRESENT EQUIPMENT

HOW OLD?

PROSPECT'S VALUATION $

USED KNOWN TO PROSPECT

WHAT DOWN PAYMENT AND TERMS DID YOU QUOTE?

PRINCIPAL POINT TO OVERCOME IN CLOSING

HAS CUSTOMER CONSIDERED COMPETING MERCHANDISE?

REMARKS:

SALESMAN ASSIGNED

STEP 1
INVESTIGATION
FILL IN INFORMATION ON THIS SIDE OF CARD
DATE OF CALL

STEP 2
LETTER FROM DEALER THANKING PROSPECT FOR INTERVIEW
DATE MAILED

(INSTRUCTIONS ON REVERSE SIDE)

Service Restored

faster than ever after ice storm . . .

ICE storms are a utility's nightmare. Recently, the Missouri Public Service Corporation had a beauty on its hands. Driven by high velocity winds, heavy sleet lashed trees and roads, coated them with 6 to 8 inches of ice, pulled down hundreds of miles of line in the 17-county service area.

Thanks to *instant communication* made possible by General Electric 2-way radio in line trucks and supervisors' cars, service was restored at least 3 to 4 days earlier than would have been possible without the use of radio, according to officials at company headquarters in Warrensburg.

Utilities in every state use G-E 2-way radio to coordinate planned interruptions, to save manhours, truck hours, time on outages. Let our engineers study your communication problem, too—there's no obligation. Write: *General Electric Company, Section 2050, Electronics Park, Syracuse, New York.*

YOU BE THE JUDGE — CHECK THESE ADVANTAGES

Equipment Features	General Electric	Manufacturer A	Manufacturer B
Triple-Tuned Transformers (high selectivity with fewer tubes)	Yes	No	No
At Least 2 Watts Peak Audio Output	Yes	No	No
Instantaneous Modulation Limiting	Yes	Yes	No
Number of Tubes	18	26	22
Cost per Set of Tubes	$24.50	$50.16	$31.79
Spurious Radiation at any frequency	65 db	60 db in the band only	60 db
Cable Junction Box	Not Required	Required	Not Required
Key Lock for Protection of Every Unit	Yes	Optional at Extra Cost	Not Available
Microphone Quick Release Plug	Yes	Not Available	Not Available
20 kc & 40 kc Receiver Selectivity	Yes	No	No
Two-Unit Design for Maximum Mounting Flexibility	Yes	No	No

You can put your confidence in—

GENERAL ELECTRIC

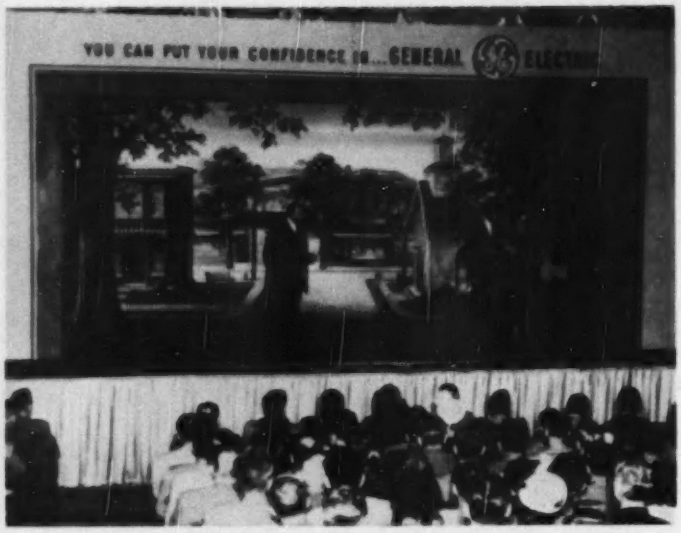
electric living centers, there are a large staff of adequate wiring advisors, selling adequacy so that appliances will be sold easily; a school counselor to equip schools with modern electrical appliances to teach the homemakers of tomorrow; kitchen plans for anyone wanting them; window displays, fair exhibits; monthly campaigns, implemented with sales manuals and helps and backed by extensive advertising.

The booklet then tells the company's industrial sales program, aimed at net revenue load building. Special training is being given to the industrial sales staff, meetings with manufacturers over new equipment and new processes; an extension course on electrical power for industrial plants will be offered department personnel by University of California. Directors of four major development classifications, lighting, commercial power, industrial power and agricultural power, will head district staff specialists who will work under district managers. A number of free services to industrial customers on rates, applications, load requirements, commercial cooking, air conditioning, pump testing, plant site location and industrial heating, will aid in development of business for the industry and load for Edison.

One of the aids to electrical dealers is a new system of prospect card follow up. The tips that Edison men and home economists obtain are put on a prospect card, in triplicate. The original goes to the dealer who is to make contact and report within ten days. The first carbon stays in the Edison issuing office, the third copy is kept by the Edison salesman for follow up. By this means a real follow up of each prospect is guaranteed.

Typical of the fair exhibits was that recently at the Orange Show in San Bernardino in March. The "once upon a time" theme was used. A central painting of Thomas Edison was featured with a montage of his many inventions. Under it was a caption, "Once upon a time a great man had an idea from which an industry grew." Then the latest models, with unusual features, of all makes of ranges were shown. Biggest attraction was a Lyons glass incubator and brooder in which it was prearranged to hatch a batch of chicks each day, each batch of a different variety and color. People were fascinated by the hatching cycle.

Edison's "full sale" commercial program is headed by Vice-President R. C. McFadden and by George Hawley, commercial manager. The domestic sales program is under Henry C. Rice, commercial and industrial is under T. L. Van Law.



Traveling shows played to G-E dealers and salesmen in major U. S. cities, like this Los Angeles presentation, sponsored by local distributor, G-E Appliances Inc.

G-E Goes Broadway

with its professional "Birth of a Salesman" show, dramatizing current selling problems

Today's selling problems took a dramatic twist when General Electric raised the curtain on its Broadway-produced "Birth of a Salesman" show, filled with professional actors to tell the story of a typical town dealer and his experiences in finding an ambitious young salesman for his store.

G-E put three troupes on the road during March and April to cover major cities across the nation with its big two-hour production. Troupe 3, headed by Webb Theleen, A & M department sales manager, played to G-E dealers and salesmen in Denver, Salt Lake City, Seattle, Portland, Oakland, Fresno, Los Angeles, Phoenix and Albuquerque. In each city the show was put on by the local G-E distributor.

In Oakland some 1,200 saw the production, hosted by General Electric Supply Co., under Mark Parnell, sales promotion manager. In Los Angeles, General Electric Appliances Inc., under Steve Maher, general manager, sponsored the show.

Using a revolving stage and the "Our Town" plot, the story unfolded in a series of flashbacks through years of depression, prosperity, war and peace. The central figure, Ben Morgan, was an average appliance dealer, who lived in Americanville. He had enjoyed the rush and profits of the post-war era, the days when dealers didn't have to sell their merchandise. Suddenly Ben found himself faced with today's competitive conditions and realized he must start aggressive selling if he were to exist. Just as important, he must find a salesman for his store who could sell.

With this in mind Ben hired a sharp-shooting salesman, Joe Peters. Joe, the so-called "natural-born" salesman, lasted just one day. Then came the promise of a natural—Bill Saunders, an ambitious young man who wanted to make a future for himself. Bill knew nothing about selling and admitted it. Here was a man who could be taught proper selling methods right from the start, who was eager to learn and would take an active interest in the business. For dealer Ben Morgan it was the real "Birth of a Salesman."

High-Accuracy Beckman pH Meter† relies on D-H ALLOYS

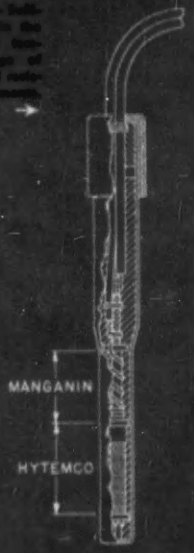
In large industrial installations, where pH control must be continuous or automatic, or both, the temperature of process solutions has to be obtained continuously, in order to compensate for effects of temperature change upon pH.

To accomplish this, the Beckman Model R Automatic pH Indicator provides a flow chamber, or immersion assembly, containing a resistance bulb thermometer in addition to the glass and calomel electrodes used in measuring pH. This resistance thermometer is an element in the feed-back circuit of a stable DC amplifier whose sensitivity is accordingly varied in proportion to the absolute temperature of the process solution.

To assure complete accuracy, the thermometer of the Beckman Model R pH Indicator is wound with D-H HYTEMCO* wire, supplemented with D-H MANGANIN. The high temperature coefficient of HYTEMCO makes it eminently suitable for this application; and the absolutely uniform behavior of this alloy, thruout a wide temperature range, helps the indicator to record pH values with utmost fidelity. The supplementary winding of D-H MANGANIN is required in order to raise the resistance of the assembly to a specific circuit value without increasing the increment of resistance with temperature. This the MANGANIN does very effectively.

In addition to the desirable electrical characteristics of these D-H alloys, however, is the outstanding uniformity of the wire from spool to spool, and the quality "built into" it —as a result of exclusive Driver-Harris know-how and advanced melting, rolling and drawing techniques.

Special alloys for special uses is an important phase of our business. If you have been unable to obtain just what you are looking for, let us know your requirements. We'll gladly put our 50 years of experience at your disposal, and supply you with the alloy best suited to your needs.



†Product of National Technical Laboratories, S. Pasadena, Calif.

Makers of world-famous Nichrome and over 80 alloys for the electrical, electronic and heat-treating fields*

Driver-Harris Company

Western Representative: **ANGUS-CAMPBELL, INC.**

1114 Valencia St., San Francisco 449 So. San Pedro St., Los Angeles

Main Office and Plant: HARRISON, NEW JERSEY

FIFTIETH ANNIVERSARY

*T. M. Reg. U. S. Pat. Off.

Teamwork Brings Results

ONE of the strongest selling teams in the West, dealers, distributors and utility, is to be found in the Utah Power & Light and Western Colorado Power Co. service area. And one of the reasons for this teamwork is the way the utility sales department, headed by Roy Ashworth, vice-president, and W. A. Huckins, sales manager, and department heads take the sales program each year to the trade and enlist its support. Without interruption even during the war the company has kept the dealers and suppliers informed and stimulated both by publishing an annual sales program and by merchandising it to dealers and distributors in a series of group meetings. The annual event has just been completed again.

This year's program, published in the ingenuous form of a visualiser with flexible plastic binding, enumerates in detail the company's aims and its specific services to aid dealers and trade to sell the quotas projected. While the program does not differ from a well established policy carried on consistently, its thoroughness is exceptional. Space does not permit even a summary of it. Those interested can obtain copies from Huckins.

"Let's gear for a banner year—1950" is its slogan, together with "Of course, sell all-electric." The program evaluates the market in 1950 in domestic, commercial and industrial fields. It restates the objectives of coordinating and stimulating the sales efforts of all branches of the electrical industry. "As a result," says Huckins, "there will be more sales, better service, good customer relations and higher standards of sales practices throughout our territory."

Major promotional activities for 1950 will include cooking schools, the farm tent exhibit, television programs daily on two local stations, home freezer promotion, electric kitchen promotions, electric homes, county and state fair exhibits, home service activities for employees' families, electrical Christmas gift activity, group demonstrations and film showings, lighting exhibits of manufacturers sponsored, street lighting promotion.

In the series of meetings just concluded the domestic sales assistance program was presented by J. F. McAllister, residential and farm sales director; home service, by Evelyn Hansen, director; commercial and municipal, by J. Homer Shaw, sales director; industrial, by Glenn B. Walker; and the advertising and sales promotion, by M. L. Cummings, director of that phase. The sales department has 57 people devoting their time to assisting the trade to sell all-electric.

Industry Show

"Electrical Wonderland—a Mid-Century Exposition of Electrical Progress" was discussed before a breakfast meeting of the San Francisco unit, Northern California Electrical Bureau, March 31. George W. Baack, president of the unit, called on Harry Lee, Sherman Clay & Co., president of the central bureau, and LeRoy Bennett, manager, for an outline of the plans for this big event, scheduled for the Civic Auditorium, Sept. 23 to Oct. 1.

Bennett explained that the entire industry was being asked to participate, not the appliance group alone. The main auditorium will be devoted generally to the appliance displays. The two side halls, Polk and Larkin halls, will be used for staged shows such as the House of Magic and similar manufacturer road shows of spectacular nature. In one the San Francisco Electrical Contractors Assn. and Local 6 of International Brotherhood of Electrical Workers will sponsor and supervise an exhibit of original Thomas A. Edison machines and inventions never before shown to the public. It was recently given to Ward Harris, Ediphone agent and collector of Edisoniana, by the Henry Ford foundation. The lighting and industrial exhibits will be shown in these two halls.

Entertainment by radio and TV stations will be suitable to a high class show and limited to short periods spaced throughout the afternoon and evening of each day. It is, however, to be a selling show, and only a small admission charge of 50 cents will be asked, in order to make it easy for interested people to attend but to keep hordes of riff r-raff out.

The show will be by, for and owned by the electrical industry, not an outside promoter. Bennett will be its manager, and he will be assisted by Walter Abrams, PG and E., and by a number of committees. J. C. S. Ross, PG and E., chairman of the executive committee of the NCEB, has placed the dealer contact staff of the company at the disposal of the bureau to sign up space by exhibitors, aid in publicity and promotion, etc. Distributors probably will be the major exhibitors and will man their booths with their dealers, giving them an opportunity to make sales of their products.

Reports were also given by chairmen of section activities. For Blaine Lind (Graybar), Walter Abrams reported a proposed electric range campaign in June and a freezer drive in August or September, an ironer campaign later in the year. Francis Falge (G-E Lamp Department) said the lighting section is displaying a model home, lighted to Horizon House standards, in San Jose in a tract of 20 adequately wired homes. School lighting, commercial and industrial and Christmas lighting activities are under way. Frank Young, for the wiring section, said the bureau would soon put on a full-time man to work on adequate wiring.

School for Salesmen

Inland Empire Electrical Dealers Assn. started its sales force development program recently with a conference on fundamentals of supervision and merchandising for owners and managers of electrical appliance firms who are members of IEEDA. The program is under the direction of Lloyd W. Cook, director of distributive education, Spokane Trade School.

Present and new sales personnel will be schooled in basic and advanced appliance salesmanship during the conference. Other subjects will be sales personality, selling techniques, elementary salesmanship and telephone contacts for non-selling employees, such as office workers, servicemen, deliverymen and wiremen.

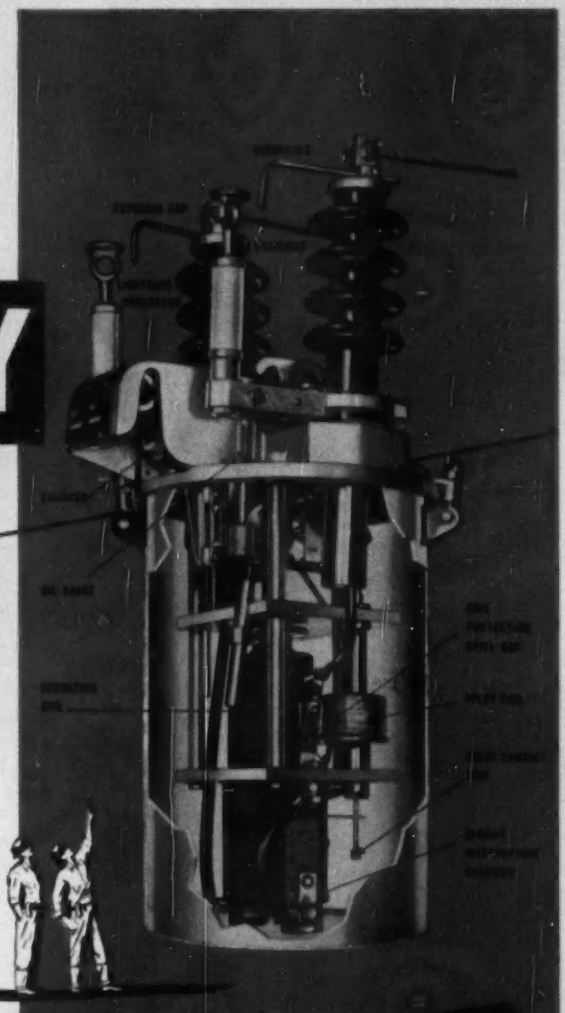
Plans are made for conference meetings of distributors with their dealers and sales personnel, and a session on public relations.

The Edison Electric Institute and National Association of Electrical Distributors film strip conference course on appliance selling is being used.

● Inland Empire Electrical Dealers' Assn., Spokane, is inaugurating a system of postcards through which it hopes to make expressive public opinion in the matter of excise taxes on appliances. Government cards are being supplied each member dealer, who in turn will give three to a customer who makes a purchase of an appliance. One card will be addressed to the congressman from the customer's district, two to his senators. If he wishes to make his feelings known in the matter of such taxes, he has simply to sign the cards and drop them in the mail.

THE Big KEARNEY

AUTOMATIC **OCR**



gives you many plus values

...it is the only full sized OCR on the market today. Farsighted users know that it will take care of the increased loads of tomorrow.

Time current characteristics of this OCR permit replacement of any OCR on your line. Write for complete information.

For Better Line Protection

Less Frequent Oil Changes and Maintenance Trips

JAMES R. KEARNEY CORPORATION

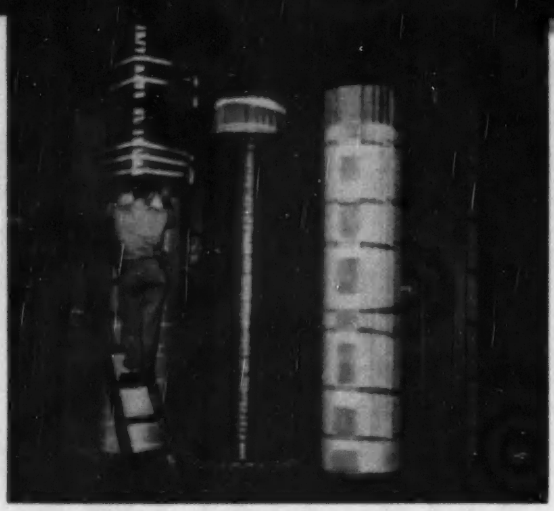
4224-42 Clayton Avenue, St. Louis 10, Missouri

West Coast Distributor: **MAYDWELL and HARTZELL, Inc.**

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

Better Construction – *SAFER* Maintenance

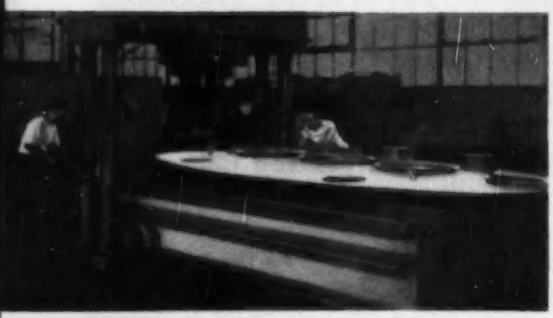
1 PLANNING BEST WAY to expedite vital 20,000 kva power transformer from drawing board to installation, A-C engineers Maise, Ashbaugh and Cook review specifications.



2 20 TONS of high-grade electrical steel is built into core. Core is 5-legged double magnetic circuit design, to keep tank height low. Cap protects low voltage coil from abrasion as it is lowered on core leg.

20,000 KVA TAKES LOAD OFF SOUTHWEST'S SHOULDERS

3 TO WITHSTAND PRESSURE of tons of oil, tank seams will be tested at a vacuum of 28" mercury. Submerged arc welding process produces a controlled, continuous weld.



4 HUGE 400 TON HYDRAULIC PRESS assures a high degree of accuracy in fabricating bosses, frames, covers, etc. Press is also used to dome cover so that it will shed water.

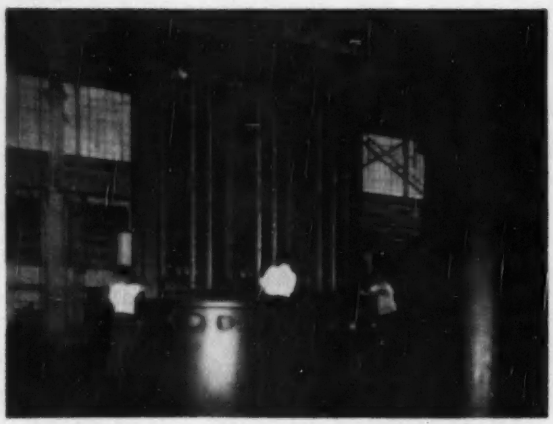
FROM AIR CONDITIONING SYSTEMS for skyscrapers to mile-deep oil wells, new commercial and industrial load requirements placed a heavy burden on the power distribution system of an expanding Southwest city.

Until . . . this 20,000 kva Allis-Chalmers power transformer was installed to serve the downtown network area, and several outlying substations.

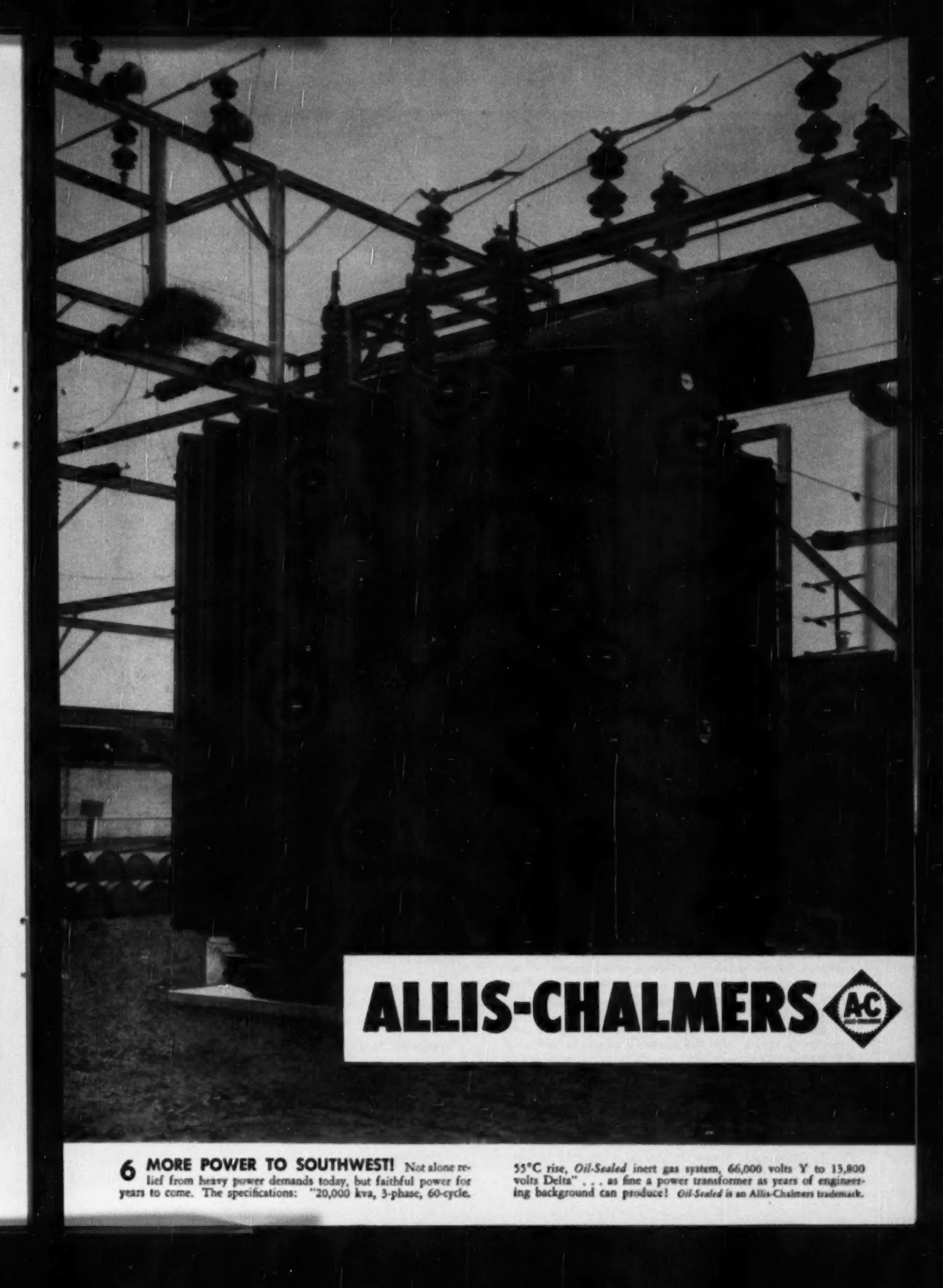
Whether 20,000 kva or the world's largest physical size transformer, such as recently completed, Allis-Chalmers has the engineering experience and facilities to build power transformers of *any* rating . . . to meet *any* system needs.

A-2982

ALLIS-CHALMERS, 939A SO. 70 ST
MILWAUKEE. WIS.



5 DOWN SHE GOES for a preliminary fit. This permits faster tanking after dry-out to maintain high dielectric strength of insulation. Notched end plates guide and accurately position assembly.



6 MORE POWER TO SOUTHWEST! Not alone relief from heavy power demands today, but faithful power for years to come. The specifications: "20,000 kva, 3-phase, 60-cycle. 55°C rise, *Oil-Sealed* inert gas system, 66,000 volts Y to 13,800 volts Delta" . . . as fine a power transformer as years of engineering background can produce! *Oil-Sealed* is an Allis-Chalmers trademark.

THE MONTH IN BRIEF

Montana Rate to REAs Equals USBR Charge

To make unnecessary further federal transmission line construction in its service area, Montana Power Co. has adopted new rate schedules for REAs. The new rate is identical to the USBR rate to such customers in the Missouri River Basin. It is applicable to light and power service supplied through one meter at one point of delivery and does not apply to stand-by service or to dump energy. Monthly demand charge is 75c per kw. of billing demand; energy charge is 3.5 mills per kwh. for the first 250 hours use per kw. of billing demand and 3.0 mills per kwh. for all additional. Monthly minimum is $1 per kw. of contract demand. Contracts are to run for not less than five years and carry a three-year cancellation notice. Savings to rural cooperatives will average about 3.2 mills per kwh. This rate equals the lowest charged by USBR to any REA in the 17 Western states in which it operates. Average rate charged by the bureau to rural cooperatives is 7.08 mills per kwh. At the Montana Power Co. rate, the co-ops will pay about 5.5 mills per kwh. at 50% load factor.

New Rate Believed Better Than Wheeling

This new REA rate was declared by Montana Power "preferable to the so-called wheeling contract" which has been negotiated for a number of months. Under that contract the company would deliver power to REAs for the USBR at the bureau rate. According to the company statement, such a contract would impose on the bureau unnecessary expense in reading meters and billing cooperatives.

Cooperative Program Proposed

In Washington, D. C. last month, J. E. Corette Jr., vice-president of Montana Power Co., proposed a program of cooperation between Rocky Mountain power companies and the federal government. Pointing out at a press conference sponsored by the National Association of Electric Companies that the government intends to build $2,000,000,000 worth of electric facilities in the Rocky Mountain area, despite the fact that 99% of the population already has electricity, he proposed: (1) We are willing to cooperate in the development of sound reclamation projects in whatever manner we are able. (2) We are prepared to negotiate contracts with the Department of Interior for the purchase of power from reclamation projects, providing the greatest possible market for such power. (3) We offer to make contracts to supply power to preference customers of the government, to reclamation plants and to federal hydraulic projects under construction. We also offer our facilities to interconnect federal plants. (4) We are prepared to coordinate our generating plant construction program with the bureau's program, provided that we are given long-term contracts which will assure us that we will not be left out on a limb.

Seattle Will Not Bid for Generating Plants

Any purchase of Puget Sound Power & Light Co. properties by the city of Seattle will include distribution facilities only, it was decided at a meeting between company and city representatives late last month. The city will not compete with PUDs for the Rock Island and White River generating plants and regards the Snoqualmie plant as too old. In lieu of the power supply that would be added by take over of the generating plants, it was decided to negotiate on the company offer to furnish power for an interim period (EWest, January, p. 98).

Grand Coulee Will Be Used for Flood Control

Flood control storage will be used at Grand Coulee to reduce flood damage in the Columbia River area during the spring runoff, it was decided by three federal agencies—USBR, Corps of Engineers and BPA. Use of 900,000 acre-ft. maximum would reduce the flood crest at Vancouver, Wash., by 1.2 ft., they said, without affecting adversely logging, sawmill and other activities in the reservoir area. Grand Coulee was not constructed for flood control, but the three agencies agreed that it should be used for storage insofar as possible without interfering with its normal functions or with business operations. A day-by-day control will be exercised during the flood period, in late May and early June. USBR will adjust discharge at Grand Coulee in accordance with daily requests of the Corps of Engineers, based on water and weather forecasts by the Weather Bureau.

AEC Research Plant Scheduled for California

Approximately 30,000 kw. initially and 150,000 kw. within four to five years are the unofficial power requirements of a projected $7,000,000 atomic energy research installation at the Livermore Naval Air Station in California. Pacific Gas and Electric Co., which is adding 600,000 kw. in new generating capacity this year, has been approached as a possible supplier of energy for the project. California Research and Development Co., a Standard Oil of California subsidiary, will operate the installation for AEC. Technical consultant will be the University of California Radiation Laboratory.

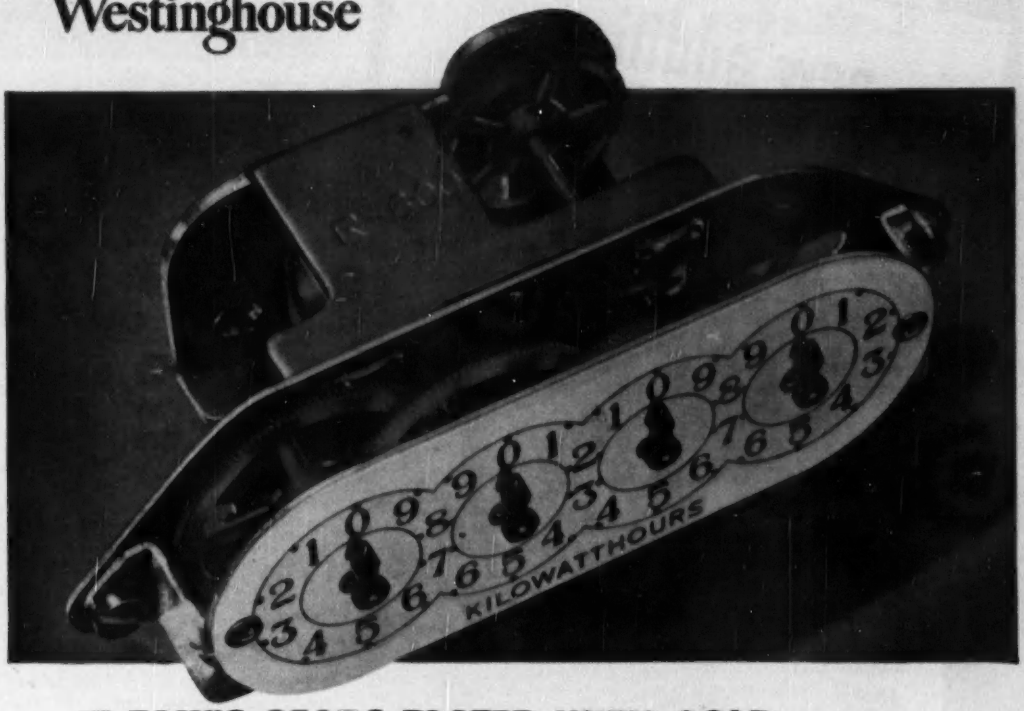
USBR Motion to Dismiss Denied

Denied by Judge Hall of Los Angeles was USBR's motion to dismiss a suit by 1,100 San Joaquin Valley farmers, charging that diversion of water impounded by Friant Dam into the Kern County canal and watershed is depriving them of their water rights. Although the judge also denied the farmers' request for a preliminary injunction ordering the government to cease water diversion, he gave them permission to amend their complaint. USBR has exceeded its authority in the Friant Dam diversion and dismissal of the case would allow it to divert every stream in the West, he ruled.

Campaign to Remove Side-Arm Heaters

A campaign by which it hopes to remove about half the 5,000 side-arm water heaters in Seattle homes has been launched by City Light. The city is offering free normal installation of 50-gal. or larger automatic electric storage water heaters. The heaters are purchased from dealers and installation is handled by electricians or plumbers.

YOU CAN BE SURE.. IF IT'S
Westinghouse



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Check your meter records. They'll prove that "extras", like gears plated with gold, actually give you the greatest return on your metering investment . . . over a *long period* of years.

Get detailed information . . . ask for the new booklet, "What It Takes for Long-time, Low-cost Metering", B-4665. Call your nearest Westinghouse office or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. J-40567

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METERS

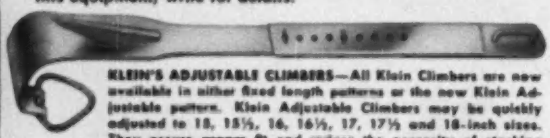
Plants at Berkeley, Calif.; Denver; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle, Sunnyvale, Calif.

*A VITAL PART OF LONG-TIME, LOW-COST METERING

new additions to the KLEIN LINE

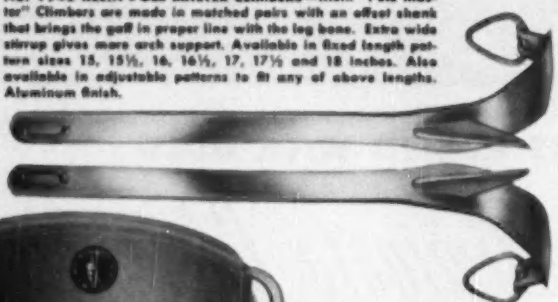
Since 1857

Mathias Klein & Sons continues to offer the electrical industry the most complete line of pliers and equipment on the market. Below are three additions to the Klein Line that have found favor with many utility companies. If you have not had complete information on this equipment, write for details.



KLEIN'S ADJUSTABLE CLIMBERS—All Klein Climbers are now available in either fixed length patterns or the new Klein Adjustable pattern. Klein Adjustable Climbers may be quickly adjusted to 15, 15½, 16, 16½, 17, 17½ and 18-inch sizes. They assure proper fit and reduce the necessity of stocking many sizes. Klein Adjustable Climbers are made of forged steel, individually tempered and tested. Aluminum finish.

No. 1045 KLEIN POLE MASTER CLIMBERS—Klein "Pole Master" Climbers are made in matched pairs with an offset shank that brings the gaff in proper line with the leg bone. Extra wide stirrup gives more arch support. Available in fixed length pattern sizes 15, 15½, 16, 16½, 17, 17½ and 18 inches. Also available in adjustable patterns to fit any of above lengths. Aluminum finish.



No. 5249 "KLEIN-LINE" TOOL BELT—This new belt is designed with a full-floating sliding trace of famous "Klein-Kord." Trace slides through alloy steel guides, allowing approximately 6 in. free movement. Chafing is avoided, and undue wear on safety strap is prevented. Apron design permits visual inspection of trace throughout its entire length.

A soft, pliable latigo leather cushion 4¾ inches wide is pad-lined and edge rolled for comfort. The 2-inch wide belt shape is of heavy harness leather with a drop forged buckle. Made in following sizes: 36, 38, 40, 42, 44 and 46 inches.

Ask Your Supplier Foreign Distributor: International Standard Electric Corp., New York

The New Klein Catalog giving full information on the complete Klein line will be sent on request.

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Established 1857 — Chicago, Ill., U.S.A.
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THIS MONTH'S NEWS

PP&L Stock Will Be Offered to Public

Stock in the Pacific Power & Light Co., purchased from American Power & Light Co. in February by an investment group headed by A. C. Allyn & Co. Inc. and Bear Sterns & Co., is expected to be offered to the investing public shortly after Aug. 6, Paul B. McKee, PP&L president, has announced.

In making the announcement McKee called attention to the fact that Pacific Power & Light is now an independent enterprise, with no holding company affiliations.

Pacific Power & Light directors have authorized sale of $9,000,000 in bonds at a premium price of $101.80 to a group of investment firms represented by Blair, Rollins & Co. Inc. and Carl M. Loeb, Rhoads & Co. The 30-year issue will carry a 3% interest coupon. With the premium received, this makes the effective interest rate 2.91%, McKee said.

Proceeds of the sale will be used to retire bank loans incurred by the company to assist in financing the company's 1948-49 building program. In 1949 the company spent $8,999,213 in a continuing program to keep pace with electrical needs of the territory it serves. Since 1945 the company's expansion program has cost $29,257,106, McKee stated.

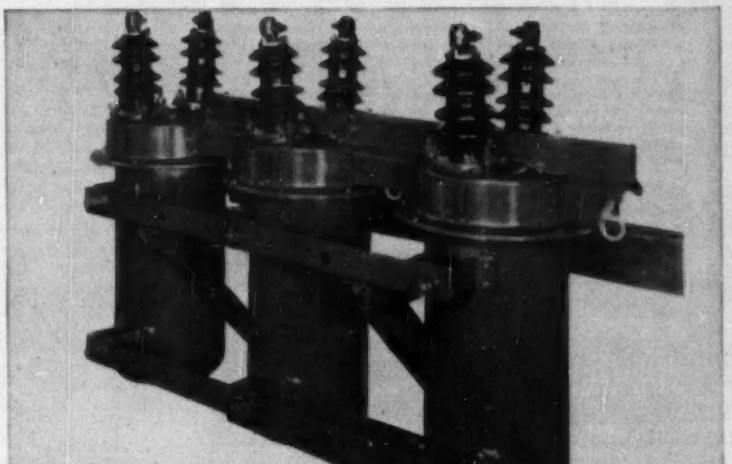
In 1949 the company added 5,400 customers and now serves 139,285 in 90 communities in Oregon and Washington, at rates of less than half the national average.

● Southern California Edison Co. plans a 1,000,000-share issue of cumulative preferred stock to help finance its $51,518,000 construction program for 1950. The company has asked the state public utilities commission for the issue's exemption from competitive bidding. Proceeds from the sale will also be used to pay off short-term notes. The proposed $25,000,000 issue is the first new financing for the company since it sold $24,800,000 in common stock a year ago.

● Idaho Power Co. has asked FPC authorization to issue 20,000 shares of 4% cumulative preferred stock, par value $100 per share. Proceeds will be used to finance the company's construction program.

new TYPE FR-3

THREE-PHASE AUTOMATIC RECLOSER



5 to 100 Amperes — 3400 to 15,000 Volts
125 to 3000 Amperes Interrupting Capacity

General Electric's new FR-3 three-phase relayed automatic recloser extends the many advantages of the G-E Type FR-1 single-phase recloser to three-phase operation for rural distribution systems.

SIMPLER—Three FR-1 single-phase reclosers of the design that has been time-proven in service have been combined as a single unit designated Type FR-3. Thus . . .

INTERCHANGEABLE PARTS greatly reduce maintenance costs. As the FR-3 is essentially three FR-1 single-phase units, it's necessary to carry in stock parts for only *one* type of recloser.

COMMON LINKAGE ties together the lock-out mechanism of the three reclosers, thus assuring positive operation. Having three reclosers working as a unit eliminates the hazard of burning out three-phase loads by one phase locking-out while the other two phases remain closed.

INTERMITTENT FAULTS cause the three reclosers to operate independently, as a single-phase recloser.

PERMANENT FAULTS in any one phase will automatically lock-open all three reclosers. Close one and you close all three.

THREE SEPARATE TANKS—instead of one big tank—greatly reduces the possibility of phase-to-phase faults, and thus further improves your service continuity record.

For complete information on the General Electric Type FR-3 recloser ask your G-E Sales Representative for a copy of GEA-5466, or write to *Apparatus Department, General Electric Company, Schenectady 5, New York.*

GENERAL ELECTRIC

with factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

"IF YOU WANT **DEPENDABLE** AUTOMATIC TIME SWITCHES INSIST ON **TORK CLOCKS"**

When you're selecting automatic time switches for indoor and outdoor use, remember the name "Tork" for all these advantages.

IDEAL FOR
Store Windows
Outdoor Signs
Heating and Air Conditioning Units
Safety and Street Lights
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Home, Factory and School Lighting

DEPENDABLE ACTION! Made with exacting care from finest materials, self-starting all-electric Tork Clocks perform with complete accuracy . . . give years of steady, trouble-free service.

VERSATILE ACTION! Thanks to Tork's many special devices, all standard models can be adjusted to fit your specific needs. Our remarkable device — amazing ASTRONOMIC DIAL — allows for variations in time of sunrise, sunset. We'll gladly explain dozens of others that save extra time, trouble, expense.

EASY INSTALLATION! These compact, modern time switches install with remarkable speed and ease on walls, outlet boxes, etc. Special weatherproof case provided with outdoor models.

ECONOMICALLY PRICED AS LOW AS $9.50 LIST

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ADJUSTABLE SWIVEL SOCKETS
IN BAKELITE AND PORCELAIN

Screw type—with no exposed connecting wires. Screws into any standard outlet. Swivel is of special die-cast material of high tensile strength and long wearing qualities. Wire leads cannot cross or twist. Maximum flexibility in any direction.

Listed by UL and CSA

No. 160
HALF SIZE

No. 161
HALF SIZE

MOUNTED ADJUSTABLE SOCKET ON ALUMINUM OUTLET BOX COVER
IN BAKELITE AND PORCELAIN

For permanent wiring. Comes with soldered leads or terminals. Has same well-built swivel unit as No. 160 above. Box cover is satin finished aluminum and comes in 3¼" and 4" sizes. A very attractive unit.

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PUGET POWER TO REDEEM PRIOR PREFERENCE STOCK

Puget Sound Power & Light Co., Seattle, is negotiating a $15,000,000 insurance company loan to redeem the company's $5 dividend prior preference stock at $110 per share plus accrued dividends, according to Frank McLaughlin, president. The program is subject to approval by the company's board of directors and the Washington State Public Service Commission.

Retirement of the 137,500 shares, held by 2,822 owners, would reduce the company's interest charges an estimated $300,000 a year.

The company's common and preferred issues have advanced in prices in recent months, on the assumption they would be retired on a basis of $18 a share for common and $110 for preferred, when a proposed sale of the company is completed. Latest Seattle quotations on the preferred stock, before the company announcement, were 104¾ bid, 106½ asked, while a New York figure of 108 was reported.

● SALE of 40,000 additional shares of preferred stock has been offered by Central Arizona Light and Power Co. at Phoenix. The new $50 par value carries a $2.35 dividend. Two other outstanding issues are 160,000 shares of $35 stock and 80,090 shares of $50. Along with the preferred issue, directors approved sale to underwriters of 125,000 shares of $5 par value stock. The issues will realize about $3,500,000, making a total of $8,500,000 available for 1950 construction, company officials said. A $5,000,000 issue was sold to Northwest Mutual Life Insurance Co. in February.

● THE SANTA BARBARA city council has accepted an offer for the sale of its municipal airport electrical distribution system to Southern California Edison for $35,000. The equipment was installed during the war when the federal government operated the port. Money obtained from the sale will be used for installation of a high-intensity lighting system at the airport and for making other improvements in conjunction with the CAA.

● PRUDENTIAL LIFE INSURANCE CO. opened a projected investment program in Hawaii by buying one third of Hawaiian Electric Co.'s new preferred stock issue for $1,000,000. Prudential bought 50,000 shares of 5% preferred at $20 a share.

● PACIFIC POWER & LIGHT CO. has received FPC authorization for a $9,000,000 issue of first mortgage bonds.

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the new SILVALINE

Service Entrance Cable—

Type SE With True URC

WEATHERPROOF Protection

Now, Anaconda gives you a completely new Service Entrance Cable that provides greater dependability, longer life, higher resistance to weather, with these 4 features . . .

1. **TRUE URC SATURANT** and Finish provide durable fibrous covering with excellent weathering properties.

2. **TOUGH NEOPRENE TAPES** cover each individual conductor — increase resistance to heat and weather . . . in 2 colors, black and red—give the preferred means of colored conductor identification.

3. **GLASS AND COTTON** combination over-all braid covering provides high resistance to deterioration and adds to life of covering.

4. **SILVER-FINISH COATING** provides for clean handling and an attractive surface . . . makes a greatly improved base for house paint—permits use of URC Saturant and Finish without discoloring externally applied paints.

To complete your information on the new Silvaline* URC-Type SE Weatherproof Service Entrance Cable, contact your nearest Anaconda Sales Office or Distributor.

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The right cable for the job

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THE MAGNO-TRONIC FLUORESCENT STARTER

PROTECTS Fully automatic thermal relay with unusually long life that eliminates blinking lights and protects all auxiliary equipment.

SIMPLIFIES Replacement of worn-out lamp automatically restores closed circuit—replacement of starter unnecessary. No button to push.

REDUCES COSTS Magno-Tronic starters provide exact timing in the lamp electrode—preheating process preventing excessive loss of emission material thereby assuring the maximum in the useful life of a lamp. The established quality of this starter saves considerable time in maintenance and man hours required to repair and/or replace an inoperative lighting unit.

VERSATILE Will operate efficiently over an extended voltage under widely varying temperatures.

GUARANTEED FOR ONE YEAR

The (SP-15-20) for use with either 15 or 20 watt lamps
The (SP-30-40) for use with either 30 or 40 watt lamps
The (SP-100) for use with 100 watt lamps

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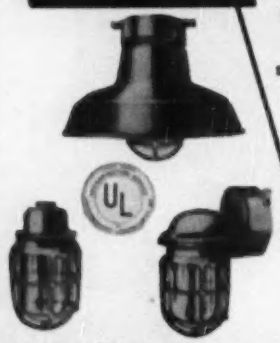
MAIN PLANT Newark 2, N. J.

R&S LIGHTING FIXTURES

Complete Line
WATERPROOF
DUST-TIGHT



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STURDY CAST METAL guard.

SPECIAL LAMP RECEPTACLE design seals wiring chamber and conduit system.

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SIZES 60 to 500 Watts.

COMPLETE LINE of Explosion-Proof type for Class 1, Groups C & D.

HIGHEST EFFICIENCY—LOWEST MAINTENANCE insured by 48 years of design and manufacturing experience.

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Precision-Built Electrical Equipment
125 BARCLAY STREET, NEW YORK 7, N. Y.

ELECTRIC HOUSE HEATING SURVEYED IN NORTHWEST

A full and complete investigation of electric house heating is to be undertaken by the Northwest Utilities Conference Committee. This committee is composed of management representatives of the Northwest Power Pool. The committee was formed at the suggestion of C. A. Erdhal, commissioner of Public Utilities of Tacoma for the purpose of coping with the power supply problems of the Northwest.

The committee has engaged the services of C. T. Hurd for making an eight-month survey. Hurd was formerly manager of the Cowlitz County PUD and a representative of the Northwest Public Power Assn. on the committee. It was felt that his wide experience in utility engineering, operation and management made him particularly well qualified to undertake a comprehensive study of the whole controversial electric house heating problem.

Since the conference committee represents both private and public power in the Northwest, the results of the investigation will be available to all utility serving agencies of the region. Findings will serve to guide them in the formation of policy regarding rates and acceptance of space heating load. Hurd's place on the committee as representative of the public power group will be taken by John Dixon, manager of the Wahkiakum County PUD at Cathlamet, Wash.

Hurd's headquarters for the survey will be at Longview, Wash.

Transmission Line is Big Problem in Development

One of the biggest problems in the proposed development of the Aluminum Co. of Canada in British Columbia is the construction of a transmission line from Kemano River to Kitimat. McNeely Dubose, vice-president of the company, stated that studies this year would determine whether a favorable damsite could be found on the Nechako River. He pointed out that the problem of transmitting power over 50 miles of very mountainous country from a possible site to the plant site at Kitimat was one of the most difficult problems involved.

● Arizona Edison and Central Arizona Light & Power companies have been found subject to FPC jurisdiction and ordered to comply with the applicable provisions of the Federal Power Act, according to an opinion issued by the commission.

More Business—More Profit—for Contractors

NOCRETE
WITHOUT CONCRETE ENCASEMENT

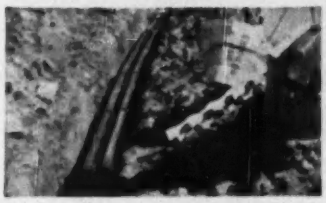
ORANGEBURG Fibre Conduit News

STANDARD
WITH CONCRETE ENCASEMENT

VOL. 1 NO. 3 MAY 1950

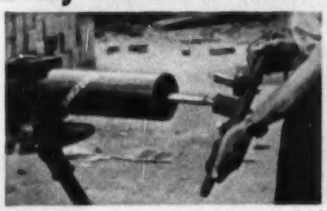
MORE DESIGN ENGINEERS SPECIFY THIS CONDUIT

For One and Two-Duct Jobs—NOCRETE



More contractors than ever appreciate the profit possibilities of NOCRETE for single or double duct runs. For when conditions favor its use, NOCRETE—installed *without* concrete encasement—*saves time, work* and *money*—in such installations as factories, schools, colleges, hospitals, drive-in theaters, power, telephone and other communications systems . . . also service entrances, parkway and suburban lighting, airport lighting and communication.

Easily Tooled on the Job



Orangeburg can be worked right in the field. It is easily tooled and can be sawed to any length. It saves time, makes work lighter for the crew. Contractors save by its use, make better net profit.

57 Years' Record of Success

Orangeburg started in 1895. Its quality and durability are *proved*. Today it is standard practice for public utilities, municipalities and industry to use Orangeburg Fibre Conduit when installing cables underground. Orangeburg is leader and first choice in every city and state.

SO LIGHT A CHILD CAN CARRY IT

Standard 4" weighs only two pounds per foot and even *Nocrete* with its heavier wall weighs but four pounds per foot in the 4" size. Think what this lighter weight means. It means lower transportation and handling costs, speedier installation.

ORANGEBURG'S OUTSTANDING ADVANTAGES

These advantages have met with wide acceptance. Each year finds more and more contractors, design engineers, utilities and municipalities turning to Orangeburg for the permanent and economical installation of electrical services underground.

1. Will not corrode. Lasts indefinitely.
2. Impermeable wall and tight joints prevent corrosive ground waters from entering.
3. Lays faster and at lower cost than any other type of conduit.
4. Low coefficient of friction keeps pulling tensions on cable to minimum.
5. Protects cable sheath from abrasion when pulled in—also from wear during cable movement resulting from alternate expansion and contraction with changing loads.
6. Resists acids, alkalis, salt, grease, oil.
7. Light, easy to handle and tool on the job.
8. Tough, resilient—will not crack or break when properly handled.

TAPERED SLEEVE JOINTS PREVENT INFILTRATION

. . . of corrosive ground waters. Easily assembled, with Tapered Sleeve Couplings, these joints are permanently watertight.

For Multiple Duct Jobs—STANDARD

ORANGEBURG STANDARD — installed *with* concrete encasement—is the economical construction where duct banks of three or more ducts are involved. In *all* installations, from single to multiple, Orangeburg lays faster, at lower cost, than any other type of conduit.

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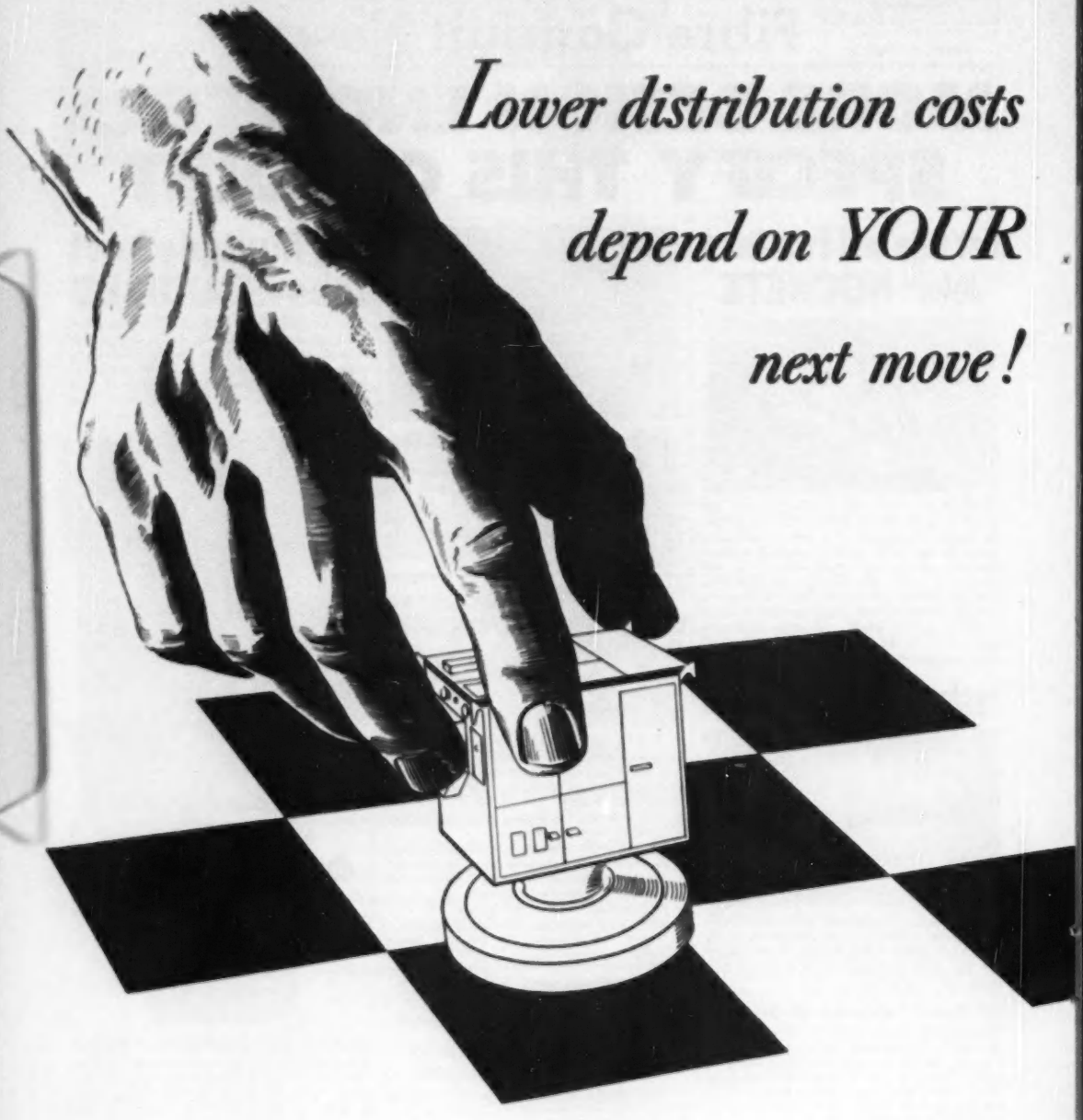
GENERAL ELECTRIC SUPPLY CORPORATION


Lower distribution costs
depend on YOUR
next move!

YOU CAN BE **SURE**.. IF IT'S

Westinghouse

. . . and there is only one way to make it count! *Have a modern system planned before you expand or make replacements to your present system.*

Loads may quadruple in the next 25 years. This means your present system will be virtually replaced within that period. So when you plan ahead . . . seek system and equipment characteristics that will enable you to cope with expanding loads *economically!*

There are several logical objectives at which you may aim:

A simplified system: Today's trend toward simple loop or radial subtransmission patterns seems certain to effect sharp cuts in distribution costs. Complex interconnections are eliminated. The cost of equipment at numerous system tie points is saved. And the inherent simplicity of these systems promises substantially lower operating and maintenance costs. What's more, the simplified system permits employment of a second important, cost-saving tool:

Standardized, factory-assembled substations . . . which utilize less equipment . . . provide for less costly bus regulation, and allow for shorter distribution feeders because you can bring high voltage closer to the load. And this is important! Standardized substations provide the flexibility needed to achieve simplification in other parts of the system. Spot networks, secondary networks and the use of banked secondaries are typical opportunities open to farsighted system planners.

Let these facts be your guide as you plan for the future . . . and let Westinghouse help. Our engineers and complete system planning facilities are at your service. Just call your Westinghouse office or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-97146

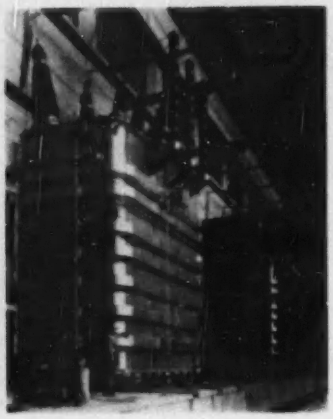
WRITE FOR A PRESENTATION OF THIS VALUABLE INFORMATION

"Electric Utility Power Distribution System," B-3905
"Co-ordinated Substations," B-4061

Plants at Berkeley Calif.; Denver; Emeryville, Calif; Los Angeles; Portland; Salt Lake City; Seattle; Sunnyvale, Calif.

Westinghouse

SYSTEM PLANNING SERVICE



Keswick Dam power plant, a few miles downstream from Shasta Dam in California, went into full operation on March 31. Power from Keswick's three 25,000-kw. units is being sold to Pacific Gas and Electric Co. and is fed over USBR's transmission line to the company's Cottonwood substation. Added to the 375,000 kw. produced by Shasta, Keswick's 75,000 kw. will bring total installed power in California's Central Valley Project to 450,000 kw. Eventually approximately one fourth of this power will be used for the six pumps at the Tracy pumping plant. The rest will be sold and revenue will be applied to help pay for the Central Valley development, where initial features will amount to more than $440,000,000 Cost of the Keswick Dam was $10,800,000; cost of power plant and switchyard was $11,200,000. Reservoir behind Keswick Dam is relatively small, having 24,000 acre-ft capacity

New Unit Operating in Kootenay River Plant

A new $1,250,000, 27,200-kw. unit at Consolidated Mining & Smelting Co.'s Brilliant power plant on the Kootenay River is in operation.

The new unit, added to two previous installations, brings the total rated capacity to 81,600 kw. and the total rated capacity of the four CM&S plants on the Kootenay River to 224,050 kw. It will be used to produce additional energy when water conditions permit, and will also act as a spare for any of the existing units.

The additional power is delivered to Trail smelter by a new 17-mile power line. The Trail plants use as much electricity as a city the size of Toronto.

The new unit was installed by CM&S in cooperation with Canadian Westinghouse Co. Ltd.

● First Phase of a $500,000 underground network construction program for downtown Sacramento was started last month, according to James E. McCaffrey, general manager and chief engineer of the Sacramento MUD.

● PUD No. 1 of Pend Oreille County, Newport, Wash., has asked FPC for a preliminary permit to investigate a proposed hydro development on the Pend Oreille River in Washington. The development would include a 45-ft.-high dam at the Box Canyon site north of Ione and a power house with installed capacity of 60,000 kw.

● PUD No. 1 of Douglas County, Bridgeport, Wash., has received REA approval for its projected Badger Mountain electrical distribution line and two transmission lines, according to George Hamilton, president of the board of commissioners. Work will be done by Rockwell-Monroe of Bremerton, low bidder with $160,666.66. Douglas PUD has operated in the north half of the county for five years and recently bought electrical properties in East Wenatchee and adjacent areas.

● The Anchorage, Alaska, Public Utilities Board has been authorized by the city council to begin negotiations for the purchase of "approximately 1,000 kw." in new generating capacity. Cost of the new generator, which will be installed in the central power house, is estimated at $75,000. Present capacity of the power house is slightly over 2,000 kw.

● Preliminary Permit for study of the proposed Iron Canyon project on the Sacramento River in Shasta and Tehama counties of California has been requested by Butte County, Calif. The project would include a dam, 54,000-kw. power plant; a reservoir for storing 503,000 acre-ft. of water annually.

Telluride Power Plans Further Expansion

Telluride Power Co. will spend an additional $300,000 for expansion in 1950, according to Paul P. Ashworth, general manager of the company. The company's postwar program already has cost almost $1,000,000. Items on the new schedule include increasing capacity of transmission lines serving Panguitch and the Garkane Power Assn.; additional automatic control equipment; expansion of the distribution systems in all communities served; installation of street lighting systems.

Rehabilitation Program Recommended for PUD

A $1,168,975 rehabilitation program for Grays Harbor PUD properties at Aberdeen, Wash., has been recommended to the district's board of commissioners by Manager F. J. Robbins to take care of present load and allow capacity for future growth. The plan calls for additional substations in Aberdeen and Hoquiam with the additional primary changes required; revamping the substations in Montesano and Elma with the required primary extensions; rural extensions, and clearing the right-of-way under existing rural lines.

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Experience—over 40 years of it—lies behind National Electric's **REDEGE** Boxes. Every detail has been carefully designed to assure an efficient, *quality* product.

REDEGE Boxes are made from the finest mild steel, full 14 gauge, assuring uniformity of quality. The flush knockouts are cleanly cut with retainers that break at the knockout edge and leave no burrs. Nail and mounting holes are conveniently located for ease of mounting. **REDEGE** Boxes are *electro*-galvanized for *permanent* resistance to rust and corrosion.

Cable, conduit, concrete, device or gang boxes —whatever you need—the "**REDEGE**" signifies full compliance with Underwriters' Laboratories, Inc.

The "REDEGE" is the mark of quality.

EVERYTHING IN WIRING POINTS TO

National Electric
PRODUCTS CORPORATION
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● FPC has issued two new state maps of electric facilities in Utah and Montana. These are the fifth and sixth in a series that eventually will include the 48 states. Maps may be secured from the Publications Section, Federal Power Commission, Washington 25, D.C., for $1 each. Order numbers are: Utah map, FPC-M-15; Montana map, FPC-M-16.

● ACTION of the Seattle city purchasing agent in rejecting the bids of two English electrical companies for transformers has been upheld by the Seattle Municipal League. A committee appointed by the league concluded that the English firms' bids had not met the city's specifications and that there was no evidence of discrimination.

● ADDITIONAL peaking capacity is being considered for installation in a separate power house at Grand Coulee Dam, according to L. N. McClellan, chief engineer, USBR, Denver. Such units would take advantage of the large storage capacity behind the dam to supply needed peaking power for the Northwest Power Pool.

Economical operation is assured by building the core and coils of every Gardner transformer to yield best results in the type of service for which it is intended. Design provides either highest rated load efficiency or highest all-day efficiency, depending on whether the transformer is for power or for distribution service. The maximum energy efficiency point is placed where it pays off in lowest actual operating losses—highest average utilization of power.

Gardner Electric Mfg. Co.
EMERYVILLE 8 CALIFORNIA

Representatives
WEST COAST
MAYDWELL & HARTZELL, INC.
MOUNTAIN STATES
ELECTRICAL SPECIALTY CO.

GARDNER TRANSFORMERS GUARD PROFITS

CONTRACTS AWARDED ON WESTERN PROJECTS

Allis-Chalmers Manufacturing Co. of Milwaukee, Wis., submitted the low complete bid of $135,900 to the Corps of Engineers for furnishing electric switchgear, power center and motor control centers for McNary Dam and Lock on the Columbia River near Umatilla, Ore., but the apparent low bids according to separate schedule of items were divided among three firms.

I-T-E Circuit Breaker Co. of Philadelphia figured low at $94,906 for the four metal-clad switchgear items, Allis-Chalmers at $31,560 for the power center, and Westinghouse Electric at $5,130 for the three motor control centers.

The successful bidder will be required to make delivery between July 16, 1951, and Jan. 1, 1952.

● AWARD of a $6,483,220 contract to General Electric Co. for generators to be installed in the McNary power house on the Columbia River near Umatilla, Ore., has been recommended by Col. William Whipple, Walla Walla District Engineer, Corps of Engineers. The contract covers the design, manufacture and delivery of four 73,624-kva. generators for power units 5 to 8. G-E already holds the contract for the first four generators.

● WESTINGHOUSE ELECTRIC CORP. submitted a low bid of $4,277,100 to the Corps of Engineers for four alternating-current generators and appurtenances to be installed at Chief Joseph Dam on the Columbia River in eastern Washington. Allis-Chalmers asked $4,524,258 and General Electric $4,534,989.

● CHELAN COUNTY PUD of Wenatchee, Wash., was receiving bids until April 19 for equipment and material for a package substation of 2,000-kva. capacity, according to Manager C. H. George. The substation will transform 33,000 volts delta to 4,160 volts wye. Another item for which the PUD will receive bids is a 3,000-kva., three-phase 33,000—2,400/4,160-volt transformer.

● SEATTLE MUNICIPAL Board of Public Works has approved the request of E. R. Hoffman, City Light superintendent, for development of a new radio-communication system to connect with a large new substation being constructed north of the city. The system, estimated to cost $118,000, will involve construction of a tower and the laying of a cable from the tower to City Light's new north substation.

WAGE INCREASES IN WEST AFFECT UTILITY WORKERS

About 43,000 employees of electric and gas utilities in the Far West got wage increases averaging around eight and nine cents an hour under collective bargaining agreements signed last year. The average was the same as in the other four regions of the country.

This is shown in a review by the Bureau of Labor Statistics of 120 wage settlements, covering 183,000 utilities employees. Most of the wage increases were between 4 and 14c an hour. More than half the workers got between 6 and 10c.

Only agreements involving 200 or more workers are included in the review.

A large proportion of the settlements granted percentage adjustments or a range of increases, instead of a flat across-the-board increase. This has been true for several years.

Here is the division:

Hourly Increase	Workers Affected
Less than 4c	1,500
4 to 5.9c	13,500
6 to 7.9c	47,000
8 to 9.9c	70,500
10 to 11.9c	26,500
12 to 13.9c	23,000
14c or more	1,000

Many workers got both increased wages and additional benefits, particularly longer paid vacations for longer service.

There were few changes in retirement and social insurance plans, which have been long established in electric and gas utilities.

Here is a breakdown of how many workers received what benefits:

Benefit	Workers Affected
Added vacation benefits	36,000
Added paid holidays	8,000
More sick leave or sick benefits	7,000
Added social insurance benefits	5,000
Added pension benefits or new plan	9,000
Increased shift differentials	6,000
Classification rate adjustments	8,000

● SEVERAL 11,000,000-kva. circuit breakers, largest in the world, are scheduled for testing in the right switchboard of Grand Coulee Dam during May by the Allis-Chalmers Mfg. Co. Others will be installed during the next two years by General Electric, Westinghouse and Pacific Electric Mfg. Corp. The 13th main generator of the Grand Coulee Dam power plant has just gone into commercial production, increasing capacity of the plant to 1,690,000 kw. under ideal conditions.

a hit for your kit!

BURNDY SERVIT

Here's the handiest split-bolt connector in any workman's kit — the Burndy Servit! Ideal for taps, dead ends, service entrances, motor leads, junction boxes, and ground wire to neutral connections.

For long years of low resistance, trouble-free connections, ask your Burndy distributor for Servit!

- Servit forces wires into tight contact!
- Made of expertly balanced alloys for high conductivity, and for strength.
- Serrated pressure bar resists crushing and spot loading.
- Withstands overload, vibration and corrosion.
- Compact — rounded edges tape easily.
- Listed by Underwriters' Laboratories Inc. from No. 18 thru 4/0 AWG.

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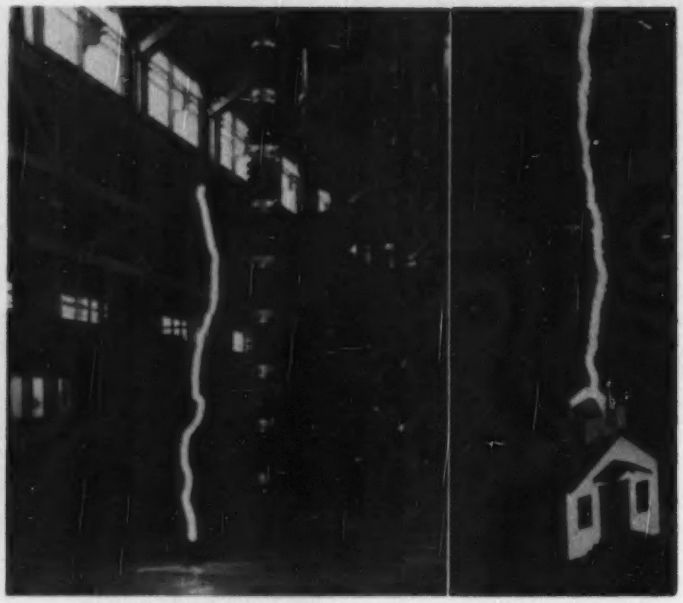
WESTERN BRANCH: VERNON 11, CALIFORNIA • CANADA: BURNDY CANADA, LTD., TORONTO 8

WEST NOW HAS 2.4 MV. IMPULSE GENERATOR

The West moved a step forward in testing facilities with the recent installation of a 2,400,000-volt lightning impulse generator at the Sunnyvale (Calif.) plant of the Westinghouse Electric Corp. It is the largest such apparatus on the West Coast. Its 2,400,000-volt maximum rating also places it among the few large machines of this type in the country. Transformers up to 230 kv. in voltage rating and up to 50,000 kva. in capacity manufactured in the West can now for the first time be given any one of the standard impulse tests. Standard CSP distribution transformers manufactured at Sunnyvale are given a 600,000-volt routine production line impulse test with a smaller impulse generator.

The 2,400,000 volts in the new equipment are obtained by charging a bank of 24 capacitors in multiple with vacuum tubes delivering 100,000 volts d-c. The capacitors are then placed in series and discharged to produce the 12-ft., 2,400,000-volt, 50,000-amp. arc shown. The discharge takes place in the very short interval of time of one and one-half millionth of a second.



Man-made lightning strikes to ground. Photo at left shows the surge generator

"Watch Engineer" Not Supervisor, says NLRB

There is a difference between the "watch engineer" at Pacific Gas and Electric Co. and the "control operator" at Ohio Power Co. PG and E's "watch engineer" is not a supervisor; Ohio Power's "control operator" is.

This is the final conclusion of the National Labor Relations Board. It denied PG and E's request for reconsideration of a ruling last December that "watch engineers" are not supervisors.

As supervisors, they would have been excluded from the bargaining group recently taken over on a system-wide basis by the AFL International Brotherhood of Electrical Workers.

PG and E had cited the Supreme Court's decision on Ohio Power's control operators, which had reversed an earlier NLRB finding, as a basis for claiming that "watch engineers" are not supervisors.

NLRB asserted there is this distinction: watch engineers, who take over from the day foremen on the second and third shifts, merely transmit the day foremen's orders. They do not themselves supervise. Control operators at Ohio Power direct other workers in emergency situations.

One NLRB member, James J. Reynolds Jr., disagreed with a majority of his colleagues, but not on the basis of the Ohio Power decision. Reynolds considers that watch engineers are in fact supervisors because they have a group of workers under them.

A point against PG and E: It has described the watch engineer's job as being of a supervisory "nature." This, NLRB says, is not enough in itself to establish the existence of supervisory authority which Taft-Hartley requires for exclusion from bargaining rights.

Natural Gas Talked in Washington State

Natural gas transported into Washington state in a 26-in. pipeline will generate about 32% more energy than will Grand Coulee Dam when it finally reaches full capacity with 18 generators in operation, engineers of the Washington State Public Service Commission have reported to Gov. Arthur B. Langlie.

The natural gas development is "far past the talking stage and offers tremendous potentialities for our continued industrial development," Langlie said. The gas would be piped in from Canada "within two or three years," under present plans.

One use for the gas will be to operate generators for creation of electric power. The public service commission already has adopted rules governing the importation of the gas.

Electrical Signal Protects Portland Blind Students

An electrical walk-wait signal designed to protect blind pedestrians has been installed by the city of Portland at a busy street crossing adjacent to the Oregon Trade School for the Blind.

The signal, designed by Briggs Clark, electric engineer for the city, operates after a pedestrian pushes one of eight buttons placed on signal posts at the four corners of the intersection. When the regular-timed traffic signal says "walk," a buzzer sounds to notify the blind person he can cross the street in safety. Each button corresponds with the direction the crosser wishes to go.

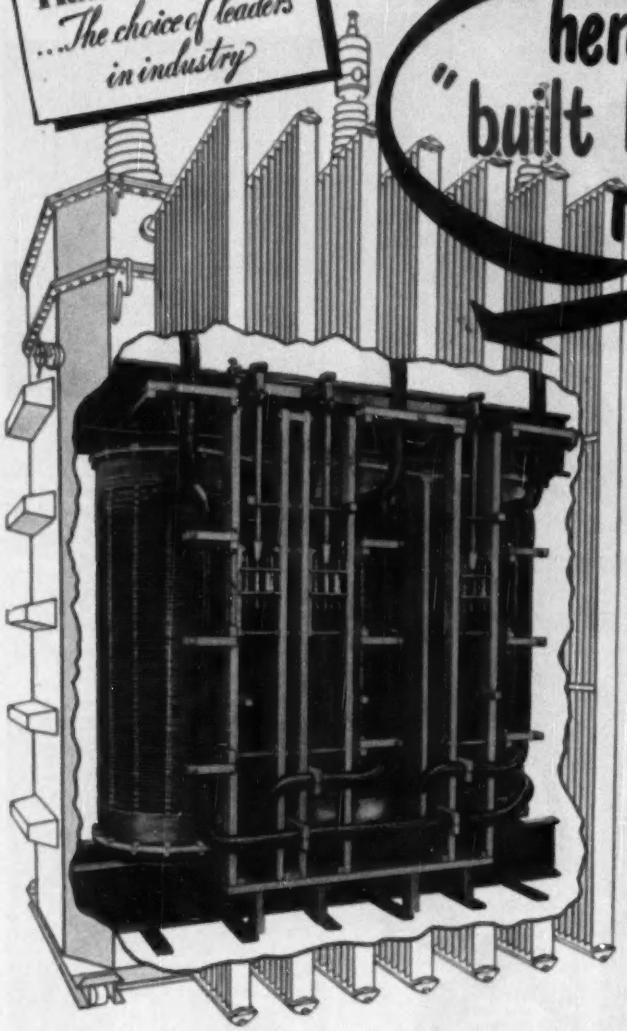
Persons who are deaf as well as blind may obtain the signals by keeping their hands on the buttons until they feel the vibration.

The intersection where the signals were installed had been dubbed "Death Valley" because of the danger to blind persons.

● CORDOVA, Alaska, has voted approval of a $500,000 revenue bond issue to buy the power, light, water and telephone systems of the Alaska Public Utilities and to construct a hydro-electric plant. The total purchase and construction program is expected to involve $1,000,000, the remaining funds being sought from the federal government.

WAGNER TRANSFORMERS
...The choice of leaders in industry

here's what "built by Wagner" means



Wagner Power Transformers have a reputation for Quality—established through sixty years of service to the power industry. Constant improvements in materials and shop practices—meticulous attention to even the smallest details of construction—rigid maintenance of quality controls—have made Wagner Power Transformers "the choice of leaders in industry." Wagner Transformers give years of uninterrupted service because of features like these:

The coils, wound with cable paper insulated conductor, are carefully insulated from each other, and are surrounded by liberal oil ducts. Coils adjacent to the line ends have extra turn insulation and additional coil-to-coil insulation to absorb the impact of high voltage line disturbances. Coil stack assemblies have locked-in insulating spacers placed radially around the coils to maintain the oil ducts. The coil stacks are vacuum-dried, then securely fastened between heavy steel end clamps and the endplate assembly, bracing the structure to withstand short circuit conditions. All outgoing leads are heavily insulated to prevent any possibility of breakdown. All leads are mechanically held in place to maintain proper electrical clearance at all times and under all conditions of operation. Snap-acting tap changers are gang operated from outside the transformer tank by means of a shaft brought out through the tank wall.

The complete story of Wagner Power Transformer construction is told in Bulletin TU-181. Write for your copy.

Wagner maintains thirty-one branch offices, located in principal cities, for quick, convenient engineering service and consultation. Consult the nearest branch for competent advice on your next transformer installation.

Wagner Electric Corporation EST. 1891

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ELECTRIC MOTORS · TRANSFORMERS · INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS – AIR AND HYDRAULIC

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CHANCE type KM Cutout

"Kick-Out"* Operation—Cuts Costs

The Chance KM Cutout KICKS OUT at the bottom after fault—a mechanical development that not only gives positive indication, but adds these cost cutting advantages:

1. Longer Life Fuse Tube—No water in tube after fault—No warping—Fast mechanical ejector—No link hang-up inside tube.
2. No Link Breakage—No stress on link in closing.
3. Longer Life Contacts—No pitting—Arc extinguished before contact breaks.

a glance tells the story

Only Chance Type KM Cutouts have this two way operation and all these plus features:

1. Non-corrosive concealed ejector spring.
2. Heavy Castings.
3. Steel shields over all moving parts.
4. Accessible cast-in terminal lugs.
5. Pivotal mounting bracket. (E.E.I.-NEMA)
6. Arc gas deflector.
7. Meets all NEMA requirements.

ABC

A. B. CHANCE CO.

CENTRALIA, MISSOURI • SAN FRANCISCO, CALIFORNIA

NEWS ABOUT PEOPLE

Moody

● R. D. MOODY, manager of Allis-Chalmers San Francisco district since 1947, has been named manager of the Los Angeles district, succeeding C. W. Schweers, who has been appointed manager of the company's New England region with headquarters in Boston. Moody is succeeded as San Francisco manager by JAMES A. LONGLEY Jr., who has been a sales representative in that office since 1946.

Longley

● WILLIAM E. NAGEL has been named San Francisco district manager of the Okonite Co. by I. W. Borda, vice-president in charge of Pacific Coast operations. Nagel has been a member of the Okonite sales staff for 14 years.

● JAMES G. HUSSEY has joined the staff of the Los Angeles office of General Radio Co.

● A. I. BENEDICT, illuminating engineer for San Diego Gas & Electric Co. since 1927, retired recently and Carlton Thompson, who had been his assistant, was named engineer in charge of lighting sales. A. E. Holloway, president of the San Diego Gas & Electric Co. and a classmate of Benedict at Purdue University, presented him with a retirement pin. Benedict had had some experience with General Electric Co. in lighting; was active in the Illuminating Engineering Society, Southern California Section, and its San Diego representative. Thompson started with the San Diego company in 1936 in the merchandising department. He had had engineering training at San Diego State College and is a registered electrical engineer in the state.

● W. H. TANEGEMAN, manager of the Ontario, Calif., General Electric Co. appliance plant, was recognized by the Los Angeles Merchants and Manufacturers Assn. for "outstanding achievement in employment and community public relations" at the association's 54th annual banquet. Mission Appliance Co., Hawthorne, Calif., was also rewarded with the group's annual recognition of an outstanding firm.

● HAROLD T. LEY, manager of Westinghouse Manufacturing and Repair Department in Portland since 1941, has been transferred to the Portland area headquarters of Westinghouse Electric Corp., and appointed maintenance sales engineer for the area.

● ROBERT M. GATES is the newly appointed sales engineer for General Electric Co.'s apparatus department in Spokane. He joined G-E after the war as student engineer at Schenectady, N. Y., where he has been located for the past three years.

● H. E. BAILEY, president of Grays Harbor County PUD Commission at Aberdeen, Wash., has resigned from the commission in protest over the action of the other two commissioners in selling a small bond issue without calling for bids.

● JOSEPH S. THOMPSON, president of Pacific Electric Mfg. Co., was guest speaker at a recent luncheon honoring San Francisco's pioneer firms, co-sponsored by the San Francisco Chamber of Commerce and San Francisco Commercitl Club.

● JOHN P. (Jack) OTTERSON has joined the staff of the Okonite Co. in San Francisco. He is a recent graduate of Stanford University where he majored in business administration.

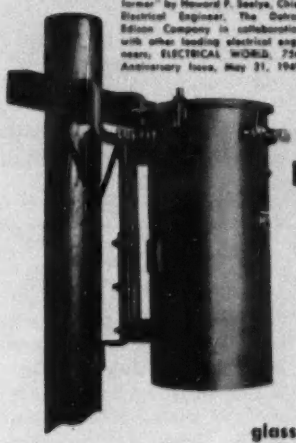
NOW! the transformer of the future

FUTURE POSSIBILITIES

. . . It is to be expected that such activity (improvements) will continue in the future. Much of it can probably not be foreseen at this time. There are a few items, however, which might be mentioned as either distinct possibilities or highly desirable.

There is considerable promise of the production of a dry-type distribution transformer for pole top installation. The advantage will be less weight and lower maintenance. It seems possible that on such a transformer the case might be reduced to a minimum or perhaps be eliminated entirely.

Excerpt from "Distribution Transformer" by Howard P. Seelye, Chief Electrical Engineer, The Detroit Edison Company in collaboration with other leading electrical engineers, ELECTRICAL WORLD, 75th Anniversary Issue, May 31, 1949.



MARCUS

DRY TYPE AIR COOLED DISTRIBUTION TRANSFORMERS

Months before the publication of this excellent article on distribution transformers, Marcus, a pioneer in the field, announced a new line of all purpose dry type distribution transformers for indoor or outdoor service.

The complete absence of hazardous oil or toxic liquid affords safety never before realized. Superior Class B and C heatproof insulation, such as fibreglass, mica, porcelain, new Johns-Manville Quinterra, etc., results in overload capacities unobtainable with Class A oil filled units. The entire transformer element is seal protected against oil, acids, moisture, etc., and is housed in a sturdy, scientifically ventilated, weather proof case which conforms with all applicable EEI-NEMA construction standards. This extremely versatile transformer can be used outdoors, pole or platform mounted or indoors at the load center, mounted wherever convenient with no expensive fireproof vault required.

Currently available in sizes to 100 KVA, voltages to 5000 V.

AIR-COOLED TRANSFORMERS EXCLUSIVELY
1 to 2,000 KVA up to 15,000 Volts to meet Individual Requirements
- DISTRIBUTION
- GENERAL PURPOSE
- UNIT SUBSTATION
- PHASE CHANGING
- ELECTRIC FURNACE
- RECTIFIER
- WELDING
- MOTOR STARTING

COMPETITIVE PRICES GOOD DELIVERIES

Write for Bulletin #49-ACO

NEMA

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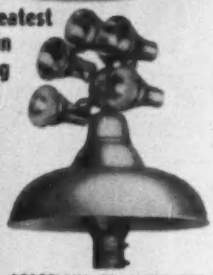
THE ONLY COMPLETE LINE OF LIGHTING EQUIPMENT FOR GAS STATIONS AIRPORTS PLAYGROUNDS SPORTS FIELDS OUTDOOR THEATRES INDUSTRIAL FARMS STREETS & BOULEVARDS



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4200 SERIES ENCLOSED FLOOD for 750, 1000 or 1500 Watt Lamps. All aluminum—easy to wire and maintain.

PYLON-LITES for any kind of mounting: Wall Type, Wrap-Around, Reel-Walls, Outdoor Theatre Entrances.

Latest ultra-high intensity airport runway marker. C.A.A. Spec. L-830

Obstruction Lights of superior design and priced to sell.

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West Coast: L. M. BAXTER CO., San Francisco, Portland, Seattle; HUGH SHEETER, Los Angeles.

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If you have a problem on the automatic control of pressure, temperature, liquid level, mechanical operations, etc., it will pay you to consult Mercoid's engineering staff — always at your service.

THE MERCOID CORPORATION

It Pays to Advertise in Electrical West

The epic story of population and industry migration Westward rivals the gold rush migrations of 1849-50. Added to the already rich and stable market afforded by the region, they make the West the nation's preeminent market for electrical equipment, materials and appliances. These are the factors that warrant special SALES and ADVERTISING attention to this market. ELECTRICAL WEST blankets the market, completely and intensively and its value as a sales builder is attested by 247 advertisers who regularly use its pages to pave the way for their salesmen.

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New and Rebuilt

ELECTRIC EQUIPMENT CO.
ROCHESTER 1 N.Y.

Write For Free 1950 Catalog

● R. W. REYNOLDS, manager of appliance, radio and television sales division of General Electric Supply Corp.'s San Francisco district, announces the appointment of R. A. McWHINNEY as major appliance sales manager for the San Francisco company. McWhinney joined GESCO's San Francisco district as a sales counselor in the East Bay area. For the past two years he has been home laundry equipment and home freezer specialist.

● EDWARD C. JOHNSON, manager of the Colgate division of Pacific Gas and Electric Co., retired on May 1, after 45 years of service with the company. W. R. BOWLER, manager of De Sabla division, becomes manager of the Colgate division.

● PACIFIC GAS AND ELECTRIC CO. has established two new departments, the department of steam generation under VIVIAN F. ESTCOURT, and the department of water systems under JOHN N. SPAULDING.

● MARY K. DOUGHERTY, at one time home service director for Central Arizona Light & Power Co., was recently appointed director of home economics for Thor Corp.

● E. WARREN SMALL of the Hawaiian Fire Rating Bureau has recently been named secretary of the Hawaiian Chapter of International Association of Electrical Inspectors.

● FREDERIC H. ENSIGN, 82, died recently at Phoenix, Ariz. He was president of the New State Electric Co. from 1911 to 1932. Before that he worked with General Electric Engineering Co. in Schenectady and became district agent of the Edison Electric Co. in Santa Ana in 1897.

● EPHRAIM H. WORTHEN, safety engineer for Puget Sound Power & Light Co. until his retirement in 1944, and longtime Seattle resident, died recently at a Tacoma hospital following a brief illness. He was 70 years old.

● ALVIN A. MILLER, 76, retired electrical engineer of Seattle, died April 5. He worked for Westinghouse Electric Corp. from 1898 to 1939. Mr. Miller was a life member of the American Institute of Electrical Engineers.

● ALVIN W. LUEKE, Long Beach, Huntington Park, Compton and San Pedro regional sales manager for Maytag West Coast Co., Los Angeles, died April 11. He joined the company in 1926 as a retail salesman and became regional manager in 1928.

Next month!

Revolutionary development that will ROCK the INDUSTRY

FEDERAL NOARK

Federal Electric Products Company, 50 Paris Street, Newark 5, N. J.

Ever-Ready Sockets

PIN TYPE

Sockets offer the most convenient and economical means of obtaining outdoor or indoor temorary lighting, since the tedious stripping, soldering and taping operations are eliminated.

In street decoration, construction lighting, carnivals, roadside stands, etc., their ease of installation and convenient flexibility is unsurpassed.

Insist on UNION'S PIN TYPE SOCKETS—the FIRST and the BEST.

No. 43308 & 43318 Standard

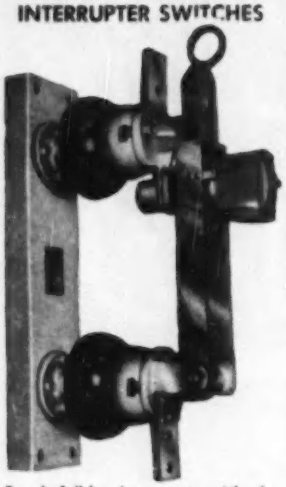
No. 44408 Intermediate

No. 11108 Candelabra

UNION INSULATING CO.

PARKERSBURG, WEST VIRGINIA

S & C "ALDUTI" INTERRUPTER SWITCHES



Break full-load currents with the arc fully confined within the interrupting unit.

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NOTES ON THE TRADE

Business Volume Good Industry Executive Says

General Electric's 1950 volume of business is budgeted to exceed 1949's record total, Ralph Cordiner, executive vice-president, told a press conference last month during the course of a Pacific Coast inspection trip. Orders and shipments for the first quarter were running ahead of budget, he reported. General Electric does not share the belief of some economists that business "might fall out of bed during the last six months," he said.

Consumer goods are back-ordered 90 days and production is at the highest level in company history, he reported. The company's production currently is divided approximately 60% capital goods, 40% consumer goods.

Cordiner sees little to become concerned about in the present unemployment picture. Today's 7% figure is less than the percentage in any previous so-called normal period.

Commenting on the present price firmness Cordiner stated that the weighted average price of all General Electric equipment and appliances has risen but 37% since 1940 as against an 84% increase for all manufactured products as reported in the U. S. Department of Commerce statistics. Cost of raw materials G-E purchases has risen 69.3% and hourly labor rates are up approximately 90%, he said.

● Federal Electric Products Co. has opened a new West Coast plant at 2885 E. Washington Blvd., Los Angeles 23. This makes the fifth factory of Federal and is designed to provide the Pacific Coast market with faster service on switchboards, panelboards, circuit breakers and other Noark products. The new plant has 22,000 sq. ft. of area in which the panelboards will be fabricated. Leonard P. Shelley is district manager. About 50 are employed in the Los Angeles plant. Shown recently at the EMEA show were Federal front-operated switches and quick-lag panelettes as well as "protectits" for fractional horsepower motors.

● Nourse Equipment Co. has moved to a new location at 1530 Wood St., Oakland.

● Warren & Bailey Co., Los Angeles, has been named a dealer for Allis-Chalmers Texrope drive equipment.

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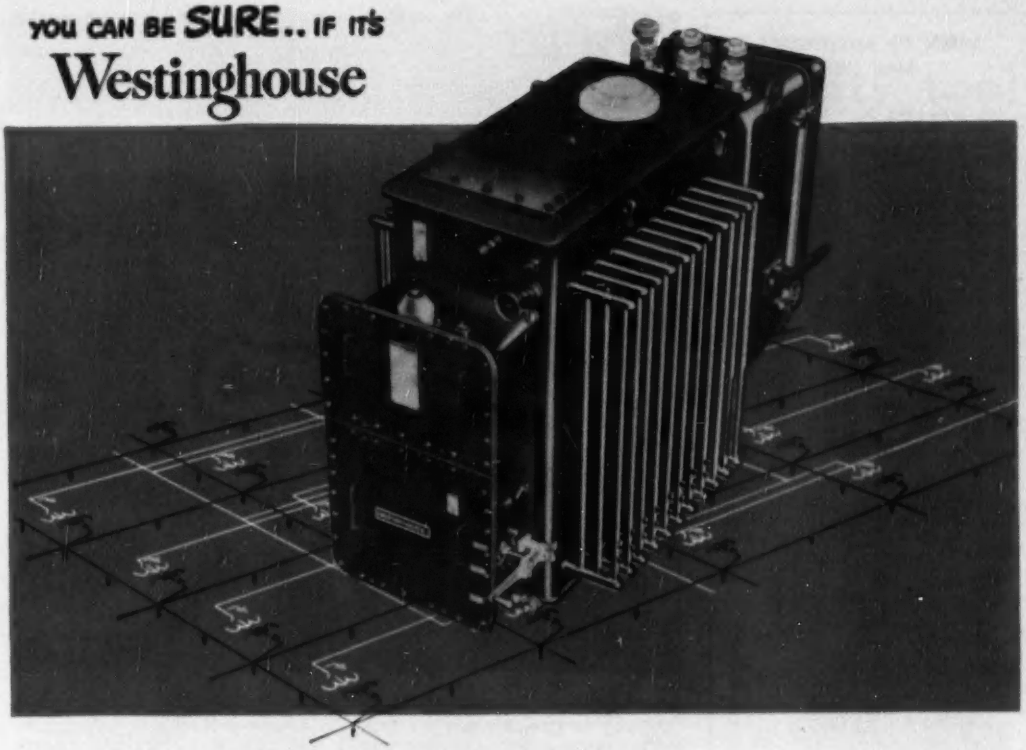

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PROFILES

Almost 100 power company and industry leaders attended the Rocky Mountain Power Conference sponsored by the RMEL and General Electric in Denver recently. Snapped during an intermission were (left to right) W. N. Clark, president, Southern Colorado Power Co; George C. Tenney, editor and publisher, Electrical West, who addressed the conference; R. C. Setterstrom, Montana Power Co; and F. M. Howard division superintendent, Mountain State Power Co., Casper, Wyo. Built around the G-E "More Power to America" theme, the conference included the premiere showing of the new G-E farm electrification film. J. J. Huether, manager, central station division, and Fred W. McChesney, industrial division, came from Schenectady for the conference

They talked on contractor credit problems—Tony Seraphin, chairman; Kenneth Bughee, Wholesalers Credit Assn.; A. F. Rahlves, Contractors State License Board, and Bruce Winship, Scott-Buttner Co., at No. California NECA dinner

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